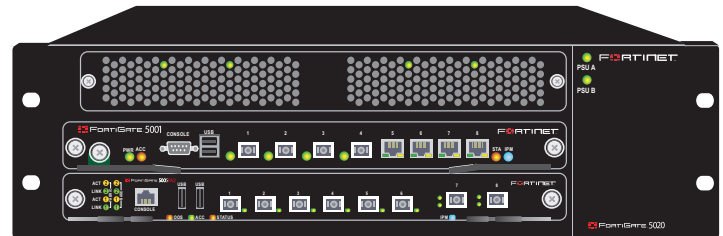
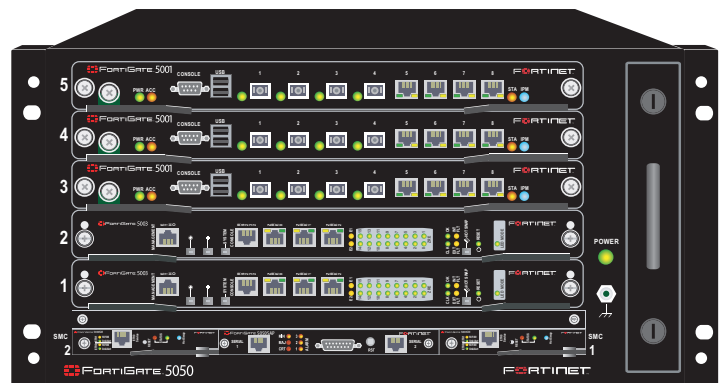
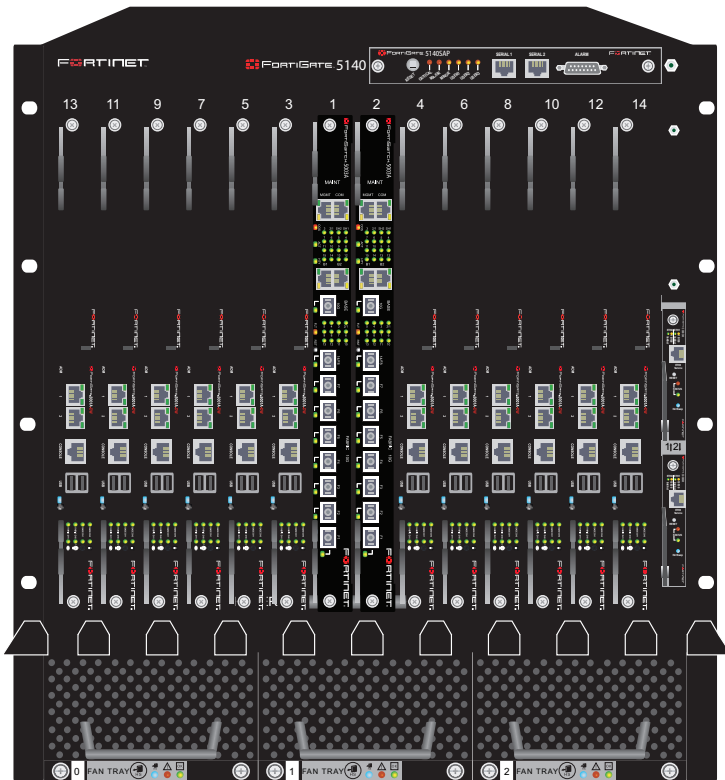


FortiGate-5000 Series

Introduction



The most recent versions of this and all FortiGate-5000 series documents are available from the [FortiGate-5000](http://docs.forticare.com) page of the [Fortinet Technical Documentation](http://docs.forticare.com) web site (<http://docs.forticare.com>).

Visit <http://support.fortinet.com> to register your FortiGate-5000 Series product. By registering you can receive product updates, technical support, and FortiGuard services.



FortiGate-5000 Series Introduction

8 January 2009

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Introduction

This *FortiGate-5000 Series Introduction* is a high-level guide to all three FortiGate-5000 series chassis and the boards that you can install in them.

This chapter includes the following topics:

- [Revision history](#)
- [About the FortiGate-5000 series chassis](#)
- [About the FortiGate-5000 series boards](#)
- [Warnings and cautions](#)
- [Fortinet documentation](#)
- [Customer service and technical support](#)
- [Register your Fortinet product](#)

Revision history

Table 1: Revision History

Version	Description of changes
01-30003-0378-20061207	New version.
01-30004-0378-20070201	Corrected “FortiGate-5020 chassis” on page 31 and “FortiGate-5005FA2 security system” on page 41 to document that FortiGate-5005FA2 boards can be installed in a FortiGate-5020 chassis. Added “Register your Fortinet product” on page 14 . Added “FA2 interfaces and active-active HA performance” on page 44 and “FA2 interfaces and active-active HA performance” on page 48 . More minor changes and fixes throughout the document.
01-30000-0378-20070615	Added the following sections: <ul style="list-style-type: none"> • “FortiGate-5005-DIST security system” on page 11 • “FortiController-5208 system” on page 11 • “The FortiGate-5005-DIST security system” on page 67 • “FortiController-5208 system” on page 73
01-30000-378-20080603	Added “FortiGate-5001A security system” on page 33 . Terminology change: “module” changed to “board” for all FortiGate-5000 series boards.
01-30000-83466-20081023	Updated “FortiGate-5001A security system” on page 33 to include the FortiGate-5001A-SW board. Added the following sections: <ul style="list-style-type: none"> • “FortiGate-RTM-XB2 system” on page 39 • “FortiSwitch-5003A system” on page 53

Table 1: Revision History

Version	Description of changes
01-30000-83466-20081023	<p>Added information about both FortiGate-5140 and both FortiGate-5050 chassis versions:</p> <ul style="list-style-type: none"> • “FortiGate-5140-R chassis” on page 15 • “FortiGate-5140 chassis” on page 19 • “FortiGate-5050-R chassis” on page 23 • “FortiGate-5050 chassis” on page 27

About the FortiGate-5000 series chassis

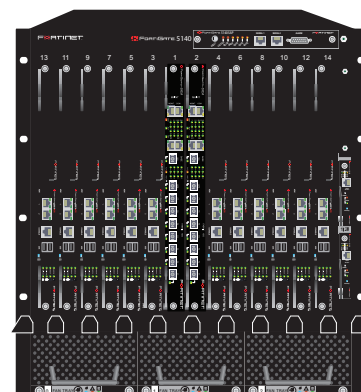
The FortiGate-5000 series Security Systems are chassis-based systems that MSSPs and large enterprises can use to provide subscriber security services such as firewall, VPN, antivirus protection, spam filtering, web filtering and intrusion prevention (IPS). The wide variety of system configurations available with FortiGate-5000 series provide flexibility to meet the changing needs of growing high performance networks. The FortiGate-5000 series chassis support multiple hot-swappable FortiGate-5000 series boards and power supplies. This modular approach provides a scalable, high-performance and failure-proof solution.

FortiGate-5140 chassis

You can install up to 14 FortiGate-5000 series boards in the 14 slots of the FortiGate-5140 ATCA chassis. The FortiGate-5140 is a 12U chassis that contains two redundant hot swappable DC power entry modules that connect to -48 VDC Data Center DC power. The FortiGate-5140 chassis also includes three hot swappable cooling fan trays.

Fortinet supplies two FortiGate-5140 chassis with very similar features. For details see:

- [“FortiGate-5140-R chassis” on page 15](#)
- [“FortiGate-5140 chassis” on page 19](#)

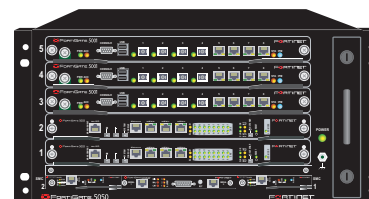


FortiGate-5050 chassis

You can install up to five FortiGate-5000 series boards in the five slots of the FortiGate-5050 ATCA chassis. The FortiGate-5050 is a 5U chassis that contains two redundant DC power connections that connect to -48 VDC Data Center DC power. The FortiGate-5050 chassis also includes a hot swappable cooling fan tray.

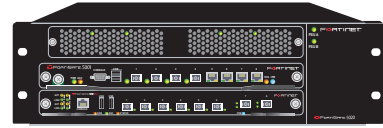
Fortinet supplies two FortiGate-5050 chassis with very similar features. For details see:

- [“FortiGate-5050-R chassis” on page 23](#)
- [“FortiGate-5050 chassis” on page 27](#)



FortiGate-5020 chassis

You can install one or two FortiGate-5000 series boards in the two slots of the FortiGate-5020 ATCA chassis. The FortiGate-5020 is a 4U chassis that contains two redundant AC to DC power supplies that connect to AC power. The FortiGate-5020 chassis also includes an internal cooling fan tray. For details about the FortiGate-5020 chassis, see [“FortiGate-5020 chassis” on page 31](#).



About the FortiGate-5000 series boards

Each FortiGate-5000 series board is a standalone FortiGate security system that can also function as part of a FortiGate HA cluster. All FortiGate-5000 series boards are also hot swappable. All FortiGate-5000 series units are high capacity security systems with multiple gigabit interfaces, multiple virtual domain capacity, and other high end FortiGate features.

FortiGate-5001A security system

The FortiGate-5001A board is an independent high-performance FortiGate security system with

two front panel gigabit ethernet interfaces, two base backplane gigabit interfaces, and two fabric backplane gigabit interfaces. Use the front panel interfaces for connections to your networks and the backplane interfaces for communication between FortiGate-5000 series boards over the ACTA chassis backplane. The fabric interfaces are reserved for future 10-gigabit operation but can be used now for board to board 1-gigabit operation. In FortiGate-5140 and FortiGate-5050 chassis you must install a FortiSwitch-5003 board or another backplane switching product to support backplane communication. For details about the FortiGate-5001A security system, see [“FortiGate-5001A security system” on page 33](#).



The FortiGate-5001A-DW front panel includes a double-width Advanced Mezzanine Card (AMC) opening. You can install a supported FortiGate AMC Double width Module (ADM) module such as the FortiGate-ADM-XB2 or the FortiGate-ADM-FB8 in the AMC opening. The FortiGate-ADM-XB2 adds two accelerated 10-gigabit interfaces to the FortiGate board and the FortiGate-ADM-FB8 adds 8 accelerated 1 gigabit interfaces.

The FortiGate-5001A-SW (single-width) includes a single-width AMC opening. You can install a supported FortiGate AMC Single width Module (ASM) such as the FortiGate-ASM-FB4 or the FortiGate-ASM-S08 in the AMC opening. The FortiGate-ASM-FB4 adds four accelerated 1-gigabit interfaces to the FortiGate board and the FortiGate-ADM-S08 adds a removable hard disk that you can use to store log files and content archives.

FortiGate-RTM-XB2 module

The FortiGate-RTM-XB2 system is a rear transition module (RTM) that provides two 10-gigabit fabric backplane interfaces and NP2 processor acceleration for FortiGate-5001A boards installed in FortiGate-5140 and FortiGate-5050 chassis. For details about the FortiGate-RTM-XB2 system, see [“FortiGate-RTM-XB2 system” on page 39](#)



FortiGate-5005FA2 security system

The FortiGate-5005FA2 board is an independent high-performance FortiGate security system with eight gigabit ethernet interfaces. The FortiGate-5005FA2 board supports high-end features including 802.1Q VLANs and multiple virtual domains. Two of the FortiGate-5005FA2 interfaces (port7 and port8) include Fortinet technology to accelerate small packet performance. FortiGate-5005FA2 boards also function as worker boards in a FortiGate-5005-DIST security system. For details about the FortiGate-5005FA2 board, see [“FortiGate-5005FA2 security system” on page 41](#).



FortiGate-5001FA2 security system

The FortiGate-5001FA2 security system is an independent high-performance FortiGate security system with eight gigabit ethernet interfaces. The FortiGate-5001FA2 board is similar to the FortiGate-5001SX board except that two of the FortiGate-5001FA2 interfaces include Fortinet technology to accelerate small packet performance. For details about the FortiGate-5001FA2 board, see [“FortiGate-5001FA2-LENC security system” on page 45](#).



FortiGate-5001SX security system

The FortiGate-5001SX security system is an independent high-performance FortiGate security system with eight gigabit ethernet interfaces. The FortiGate-5001SX board supports high-end features including 802.1Q VLANs and multiple virtual domains. For details about the FortiGate-5001SX security system, see [“FortiGate-5001SX security system” on page 49](#).



FortiSwitch-5003A system

The FortiSwitch-5003A system provides 10/1-gigabit fabric backplane channel layer-2 switching and 1-gigabit base backplane channel layer-2 switching in a dual star architecture for the FortiGate-5140 and FortiGate-5050 chassis. The FortiGate board provides a total capacity of 200 Gigabits per second (Gbps) throughput. For details about the FortiSwitch-5003A system, see [“FortiGate-5001SX security system” on page 49](#).



FortiSwitch-5003 system

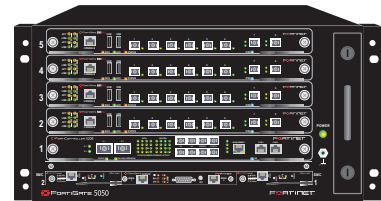
The FortiSwitch-5003 system provides base backplane communication between



FortiGate security boards installed in FortiGate-5140 or FortiGate-5050 chassis. Base backplane communication can be used for HA heartbeat communication and for data communication. The FortiSwitch-5003 board can also provide HA heartbeat and data communication between chassis. The FortiSwitch-5003 board is only used in FortiGate-5140 and FortiGate-5050 chassis. For details about the FortiSwitch-5003 board, see [“FortiSwitch-5003 system” on page 61](#).

FortiGate-5005-DIST security system

The FortiGate-5005-DIST security system is very similar to a single FortiGate unit, but with much higher capacity and with support for failover protection and scalability. The FortiGate-5005-DIST security system consists of a FortiGate-5050 or FortiGate-5140 chassis with one or two Input/Output or I/O boards



(FortiController-5208 boards) and one or more worker boards (FortiGate-5005FA2 boards running in DIST mode). The I/O boards provide 10 gigabit and 1 gigabit network connections and distribute traffic to the worker boards. The worker boards provide FortiGate security system functions including firewall, VPN, IPS, antivirus, antispam, and so on. For details about the FortiGate-5005-DIST security system, see [“The FortiGate-5005-DIST security system” on page 67](#).

FortiController-5208 system

An integral part of a FortiGate-5005-DIST Security System, the FortiController-5208



board provides all Fortigate-5005-DIST 10gigabit and 1 gigabit network interfaces. The FortiContro0ller-5208 board also provides the management interface to the FortiGate-5005-DIST system and controls backplane communication between all FortiGate-5005-DIST components.

You can create a FortiGate-5005-DIST high-throughput multi-threat network security system using one or two FortiGate boards and multiple FortiGate-5005 boards in a FortiGate-5050 or FortiGate-5140 chassis. A FortiGate-5020 chassis cannot be used to create a FortiGate-5005-DIST system. Functionally, one or two FortiGate boards using the processing power of multiple FortiGate-5005 boards function much like a single FortiGate unit, but with far greater capacity. For details about the FortiController-55208 board, see [“FortiController-5208 system” on page 73](#).

Warnings and cautions

Only trained and qualified personnel should be allowed to install or maintain FortiGate-5000 series equipment. Read and comply with all warnings, cautions and notices in this document.



CAUTION: Risk of Explosion if Battery is replaced by an Incorrect Type. Dispose of Used Batteries According to the Instructions.



Caution: You should be aware of the following cautions and warnings before installing FortiGate-5000 series hardware

- Turning off all power switches may not turn off all power to the FortiGate-5000 series equipment. Some circuitry in the FortiGate-5000 series equipment may continue to operate even though all power switches are off.
- Many FortiGate-5000 components are hot swappable and can be installed or removed while the power is on. But some of the procedures in this document may require power to be turned off and completely disconnected. Follow all instructions in the procedures in this document that describe disconnecting FortiGate-5000 series equipment from power sources, telecommunications links and networks before installing, or removing FortiGate-5000 series components, or performing other maintenance tasks. Failure to follow the instructions in this document can result in personal injury or equipment damage.
- Install FortiGate-5000 series chassis at the lower positions of a rack to avoid making the rack top-heavy and unstable.
- Do not insert metal objects or tools into open chassis slots.
- Electrostatic discharge (ESD) can damage FortiGate-5000 series equipment. Only perform the procedures described in this document from an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an anti-static wrist strap and attaching it to an available ESD connector such as the ESD sockets provided on FortiGate-5000 series chassis.
- Make sure all FortiGate-5000 series components have reliable grounding. Fortinet recommends direct connections to the building ground.
- If you install a FortiGate-5000 series component in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Make sure the operating ambient temperature does not exceed Fortinet's maximum rated ambient temperature.
- Installing FortiGate-5000 series equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.
- FortiGate-5000 series chassis should be installed by a qualified electrician.
- FortiGate-5000 series equipment shall be installed and connected to an electrical supply source in accordance with the applicable codes and regulations for the location in which it is installed. Particular attention shall be paid to use of correct wire type and size to comply with the applicable codes and regulations for the installation / location. Connection of the supply wiring to the terminal block on the equipment may be accomplished using Listed wire compression lugs, for example, Pressure Terminal Connector made by Ideal Industries Inc. or equivalent which is suitable for AWG 10. Particular attention shall be given to use of the appropriate compression tool specified by the compression lug manufacturer, if one is specified.

About Data Center DC power

The FortiGate-5140 and FortiGate-5050 chassis are designed to be installed in a Data Center or similar location that has available -48VDC power. Fortinet expects that most FortiGate-5140 or FortiGate-5050 customers will be installing their FortiGate equipment in a data center or similar location that is already equipped with a -48VDC power system that provides power to existing networking or telecom equipment. The FortiGate-5140 and FortiGate-5050 chassis are designed to be connected directly to this DC power system.

In this document, *Data Center DC power* refers to a -48VDC power system that is already available at the location at which the FortiGate-5140 or FortiGate-5050 chassis is being installed.

Fortinet documentation

The most up-to-date publications and previous releases of Fortinet product documentation are available from the Fortinet Technical Documentation web site at <http://docs.forticare.com>.

Fortinet Tools and Documentation CD

All Fortinet documentation is available from the Fortinet Tools and Documentation CD shipped with your Fortinet product. The documents on this CD are current at shipping time. For up-to-date versions of Fortinet documentation see the Fortinet Technical Documentation web site at <http://docs.forticare.com>.

Fortinet Knowledge Center

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Register your product by visiting <http://support.fortinet.com> and selecting Product Registration.

To register, enter your contact information and the serial numbers of the Fortinet products that you or your organization have purchased. You can register multiple Fortinet products in a single session without re-entering your contact information.

FortiGate-5140-R chassis

You can install up to 14 FortiGate-5000 series boards in the 14 front panel slots of the FortiGate-5140 ATCA chassis. The FortiGate-5140 is a 12U chassis that contains two redundant hot swappable DC power entry modules that connect to -48 VDC Data Center DC power. The FortiGate-5140 chassis also includes three hot swappable cooling fan trays and a front accessible air filter. If all 14 front panel slots contain FortiGate-5005A2, FortiGate-5001SX, or FortiGate-5001FA2 boards the FortiGate-5140 chassis provides a total of 112 FortiGate gigabit ethernet interfaces. If all 14 slots contain FortiGate-5001A boards the FortiGate-5140 chassis supports 28 1-Gigabit ethernet FortiGate interfaces. If you add FortiGate-ADM-XB2 modules to the FortiGate-5001A boards the FortiGate-5140 chassis supports another 28 10-Gigabit interfaces.

You can also install a FortiSwitch-5003A or FortiSwitch-5003 board in the FortiGate-5140 chassis to provide base backplane communications. Base backplane communications can be used for HA heartbeat communications and for data communications. You can add a second FortiSwitch-5003A or FortiSwitch-5003 board for redundancy. FortiSwitch-5003A boards can also provide fabric backplane communication using the FortiGate-5140 fabric backplane channels.

You can mix and match any combination of FortiGate-5000 series boards in the FortiGate-5140 chassis. For example, you could install four FortiGate-5005FA2 boards, four FortiGate-5001SX boards, and four FortiGate-5001FA2 boards. You can also install FortiController-5208 and FortiGate-5005FA2 boards in a FortiGate-5140 chassis to create a FortiGate-5005-DIST security system.

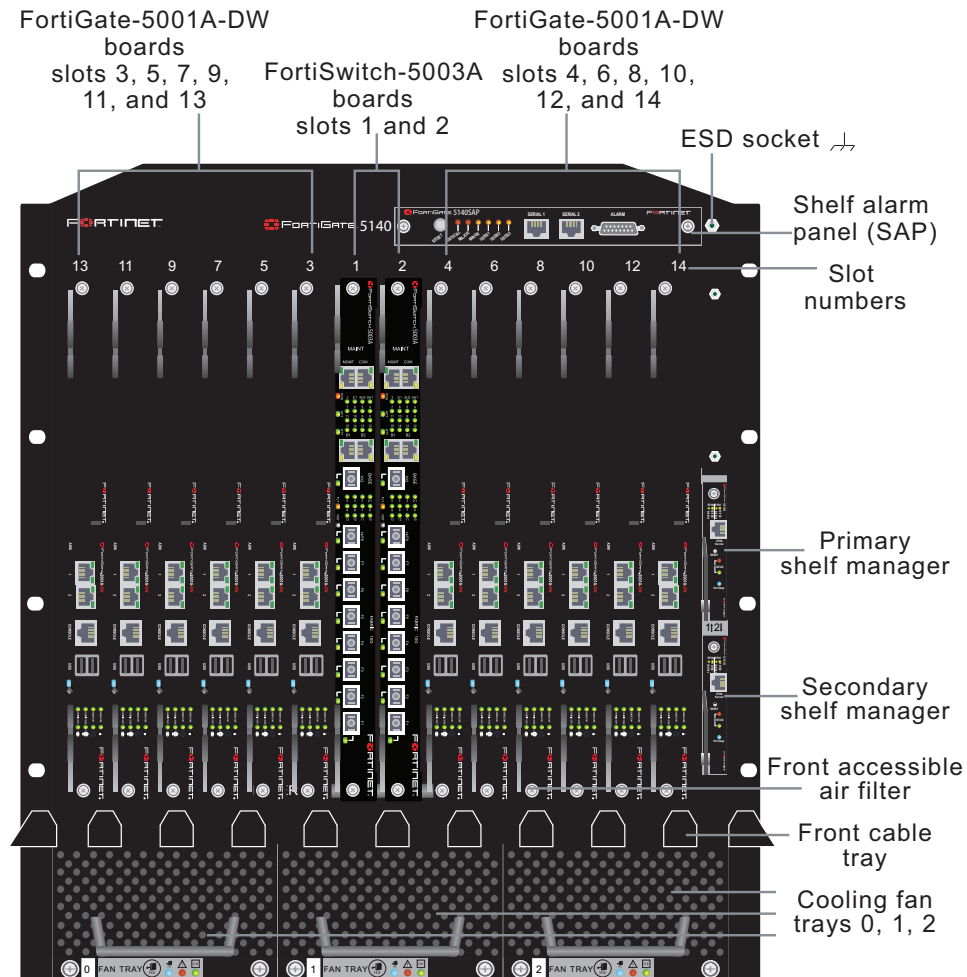
Some of the boards installed in a FortiGate-5140 chassis can be operating in a FortiGate HA cluster and some can be operating as standalone FortiGate units. You can also operate multiple HA clusters and standalone FortiGate units in a single FortiGate-5140 chassis. You can also use FortiSwitch-5003A or FortiSwitch-5003 boards to operate HA clusters consisting of FortiGate-5000 series boards installed in multiple FortiGate-5000 chassis. You can also use FortiSwitch-5003A boards for fabric data communication between chassis.

The FortiGate-5140 chassis requires -48VDC Data Center DC power. If DC power is not available you can install a FortiGate-5053 power converter tray (purchased separately) with FortiGate-5140 power supplies.

FortiGate-5140 chassis front panel

Figure 1 shows the front panel of a FortiGate-5140 chassis. Two FortiSwitch-5003A boards are installed in slots 1 and 2. Twelve FortiGate-5001A-DW boards installed in slots 3 to 14.

Figure 1: FortiGate-5140 chassis front panel with FortiGate-5001A-DW and FortiSwitch-5003A boards installed



The FortiGate-5140 shelf alarm panel (SAP) and primary and secondary FortiGate-5140 Shelf Managers are also visible. The factory installed shelf alarm panel displays alarms, provides a telco alarm interface, and also provides serial connections to the shelf managers. The factory installed shelf managers provide power distribution, cooling, alarms, and shelf status for the FortiGate-5140 chassis.



Caution: Do not operate the FortiGate-5140 chassis with open slots on the front panel. For optimum cooling performance and safety, the slots must contain a FortiGate-5000 series board or an air baffle slot filler. As well the removable terminal block cover must be installed over the power connectors on the back of the chassis.

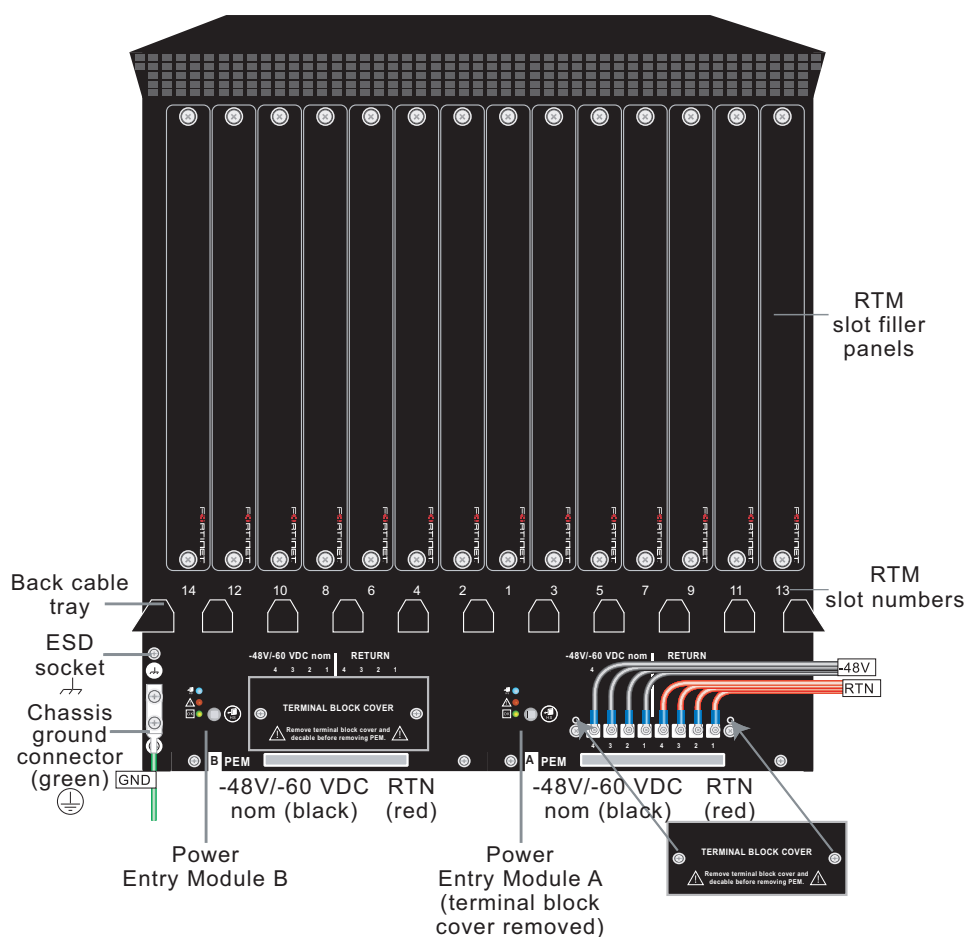
Also visible on the front of the FortiGate-5140 chassis:

- Electrostatic discharge (ESD) socket, used for connecting an ESD wrist or ankle band when working with the chassis.
- Front cable tray, used for managing and securing ethernet and other cables.
- Front accessible air filter.
- Three hot swappable FortiGate-5140 cooling fan trays.

FortiGate-5140 chassis back panel

Figure 2 on page 17 shows the back panel of the FortiGate-5140 chassis. The back panel includes two hot-swappable redundant -48V/-60 VDC power entry modules (PEMs) labelled A and B. Fortinet ships the FortiGate-5140 chassis with PEM A and B installed. The PEMs provide redundant DC power connections for the FortiGate-5140 chassis and distribute DC power to the chassis slots and to the fan trays.

Figure 2: FortiGate-5140 chassis back panel



If you require redundant power you should connect both PEMs to DC power. If redundant power is not required, you should connect PEM A to DC power. Each PEM has four -48V/-60 VDC connectors and 4 RTN connections. All eight of these connectors should be connected to DC power. Figure 2 on page 17 shows the terminal block cover removed from PEM A and the wiring required to connect PEM A to DC power. While operating the FortiGate-5140 both terminal block covers should be installed.

The power entry modules are hot swappable, which means you can remove and replace a defective PEM while the FortiGate-5140 is operating assuming that the FortiGate-5140 system has both PEMs connected to DC power for redundancy.

The back panel also includes the back cable tray, an ESD socket and the chassis ground connector. The ground connector must be connected to Data Center ground. Use the back cable tray for securing and managing DC power, RTN, and ground wires.

Physical description of the FortiGate-5140 chassis

The FortiGate-5140 chassis is a 12U chassis that can be installed in a standard 19-inch rack. [Table 2](#) describes the physical characteristics of the FortiGate-5140 chassis.

Table 2: FortiGate-5140 chassis physical description

Dimensions	21 x 19 x 20.6 in. (53.3 x 48.3 x 52.4 cm) (Height x Width x Depth)
Shipping weight completely assembled with packaging	110 lb. (50 kg)
Operating environment	Temperature: 32 to 104°F (5 to 45°C)
	Relative humidity: 5 to 85% (Non-condensing)
Storage environment	Temperature: -13 to 158°F (-25 to 70°C)
	Relative humidity: 5 to 85% (Non-condensing)
Power consumption	Maximum: 2,980W DC
Power input	2x redundant -37VDC to -72VDC, 30A per power feed (total 4 + 4 power feeds)

FortiGate-5140 chassis

You can install up to 14 FortiGate-5000 series boards in the 14 front panel slots of the FortiGate-5140 ATCA chassis. The FortiGate-5140 is a 12U chassis that contains two redundant hot swappable DC power entry modules that connect to -48 VDC Data Center DC power. The FortiGate-5140 chassis also includes three hot swappable cooling fan trays. If all 14 front panel slots contain FortiGate-5005A2, FortiGate-5001SX, or FortiGate-5001FA2 boards the FortiGate-5140 chassis provides a total of 112 1-Gigabit ethernet FortiGate interfaces. If all 14 slots contain FortiGate-5001A boards the FortiGate-5140 chassis supports 28 1-Gigabit ethernet FortiGate interfaces. If you add FortiGate-ADM-XB2 modules to the FortiGate-5001A boards the FortiGate-5140 chassis supports another 28 10-Gigabit interfaces.

You can also install a FortiSwitch-5003A or FortiSwitch-5003 board in the FortiGate-5140 chassis to provide base backplane communications. Base backplane communications can be used for HA heartbeat communications and for data communications. You can add a second FortiSwitch-5003A or FortiSwitch-5003 board for redundancy. FortiSwitch-5003A boards can also provide fabric backplane communication using the FortiGate-5140 fabric backplane channels.

You can mix and match any combination of FortiGate-5000 series boards in the FortiGate-5140 chassis. For example, you could install four FortiGate-5005FA2 boards, four FortiGate-5001SX boards, and four FortiGate-5001FA2 boards. You can also install FortiController-5208 and FortiGate-5005FA2 boards in a FortiGate-5140 chassis to create a FortiGate-5005-DIST security system.

Some of the boards installed in a FortiGate-5140 chassis can be operating in a FortiGate HA cluster and some can be operating as standalone FortiGate units. You can also operate multiple HA clusters and standalone FortiGate units in a single FortiGate-5140 chassis. You can also use FortiSwitch-5003A or FortiSwitch-5003 boards to operate HA clusters consisting of FortiGate-5000 series boards installed in multiple FortiGate-5000 chassis. You can also use FortiSwitch-5003A boards for fabric data communication between chassis.

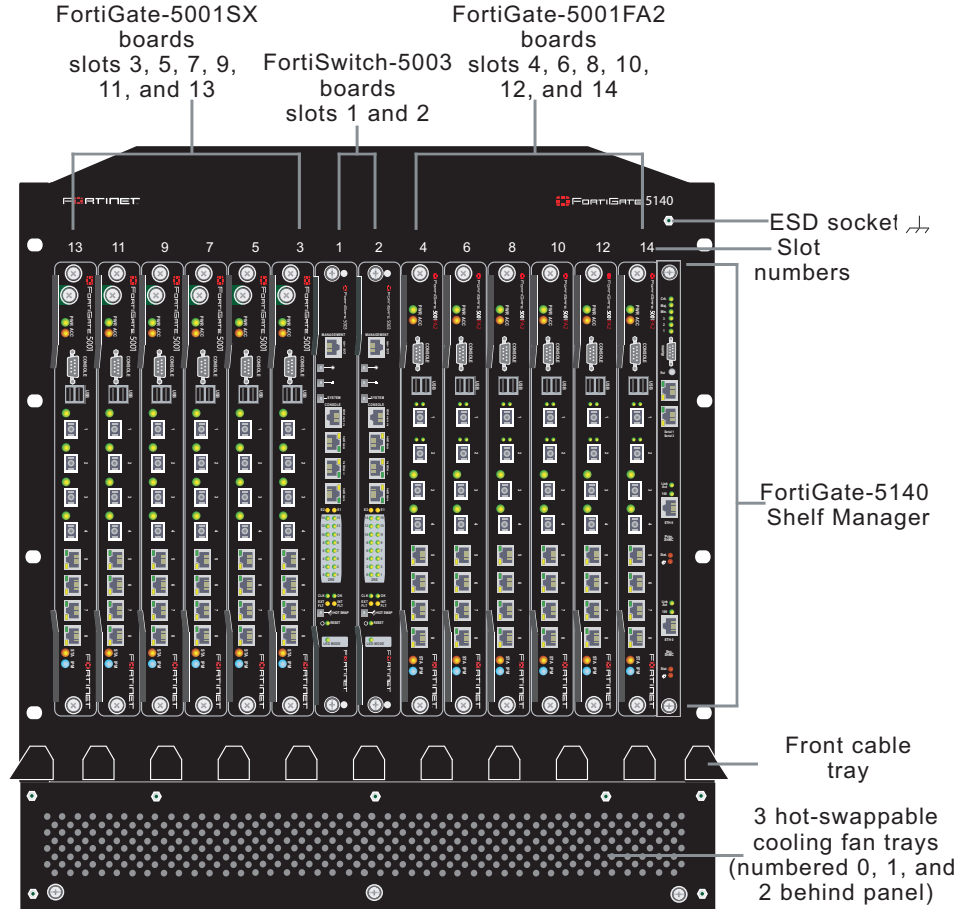
The FortiGate-5140 chassis requires -48VDC Data Center DC power. If DC power is not available you can install a FortiGate-5053 power converter tray (purchased separately) with FortiGate-5140 power supplies.

FortiGate-5140 chassis front panel

Figure 3 shows the front panel of a FortiGate-5140 chassis. Two FortiSwitch-5003 boards are installed in slots 1 and 2. Six FortiGate-5001SX boards are installed in slots 3, 5, 7, 9, 11, and 13 and six FortiGate-5001FA2 boards are installed in slots 4, 6, 8, 10, 12, and 14.

The primary and secondary FortiGate-5140 Shelf Managers are also visible. The factory installed shelf managers provide power distribution, cooling, alarms, shelf status, and a telco alarm interface for the FortiGate-5140 chassis.

Figure 3: FortiGate-5140 chassis front panel with FortiGate-5001SX, FortiGate-5001FA2, and FortiSwitch-5003 boards installed



Also visible on the front of the FortiGate-5140:

- Electrostatic discharge (ESD) socket, used for connecting an ESD wrist or ankle band when working with the chassis.
- Front cable tray, used for managing and securing ethernet and other cables.
- Three hot swappable FortiGate-5140 cooling fan trays.

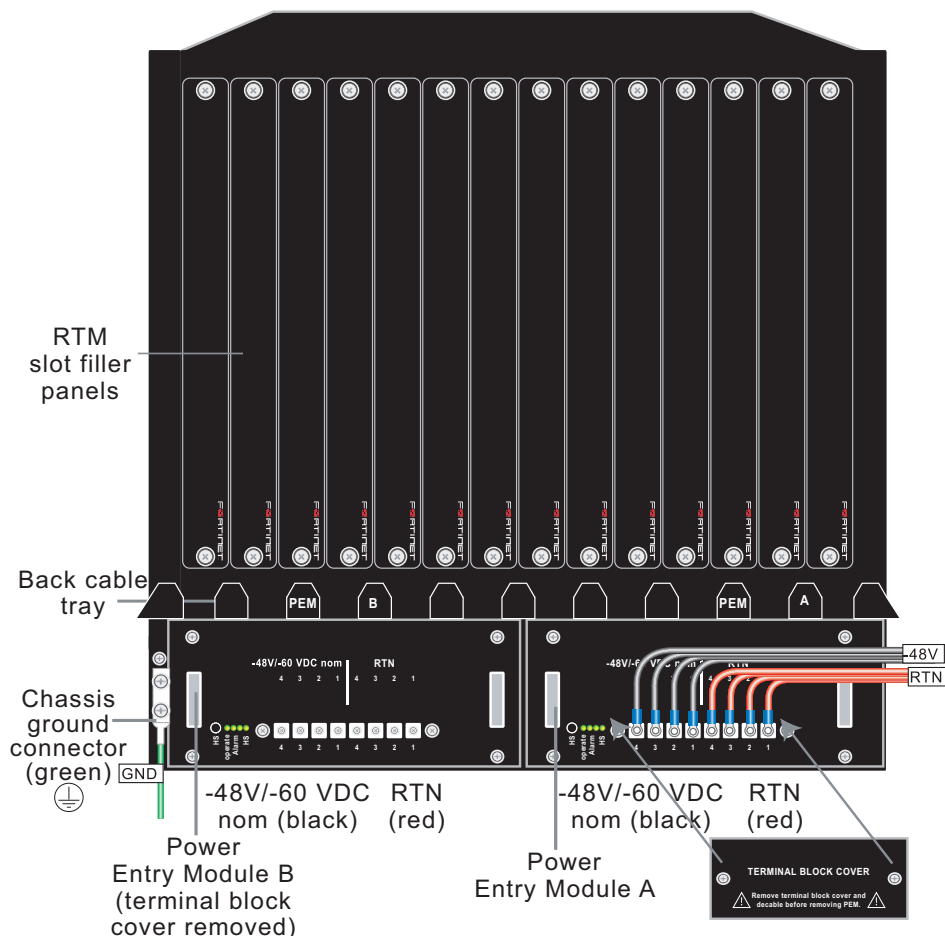


Caution: Do not operate the FortiGate-5140 chassis with open slots on the front panel. For optimum cooling performance and safety, the slots must contain a FortiGate-5000 series board or an air baffle slot filler. As well the removable terminal block cover must be installed over the power connectors on the back of the chassis.

FortiGate-5140 chassis back panel

Figure 4 shows the back panel of the FortiGate-5140 chassis. The back panel includes two hot-swappable redundant -48V/-60 VDC power entry modules (PEMs) labelled PEM A and PEM B. Fortinet ships the FortiGate-5140 chassis with PEM A and PEM B installed. The PEMs provide redundant DC power connections for the FortiGate-5140 chassis and distribute DC power to the fan trays and to the FortiGate-5000 series boards installed in the FortiGate-5140 chassis.

Figure 4: FortiGate-5140 chassis back panel



If you require redundant power you should connect both PEMs to DC power. If redundant power is not required, you should connect PEM A to DC power. Each PEM has four -48V/-60 VDC connectors and 4 RTN connections. All eight of these connectors should be connected to DC power. Figure 4 on page 21 shows the terminal block cover removed from PEM A and the wiring required to connect PEM A to DC power. While operating the FortiGate-5140 both terminal block covers should be installed.

The power entry modules are hot swappable, which means you can remove and replace a defective PEM while the FortiGate-5140 is operating assuming that the FortiGate-5140 system has both PEMs connected to DC power for redundancy.

The back panel also includes the back cable tray, an ESD socket and the chassis ground connector. The ground connector must be connected to Data Center ground. Use the back cable tray for securing and managing DC power, RTN, and ground wires.

Physical description of the FortiGate-5140 chassis

The FortiGate-5140 chassis is a 12U chassis that can be installed in a standard 19-inch rack. [Table 3](#) describes the physical characteristics of the FortiGate-5140 chassis.

Table 3: FortiGate-5140 chassis physical description

Dimensions	21 x 19 x 16.8 in. (53.3 x 48.3 x 42.7 cm) (H x W x D)
Shipping weight completely assembled with packaging	110 lb. (50 kg)
Operating environment	Temperature: 32 to 104°F (0 to 40°C)
	Relative humidity: 5 to 95% (Non-condensing)
Storage environment	Temperature: -13 to 158 °F (-25 to 70°C)
	Relative humidity: 5 to 95% (Non-condensing)
Power consumption	Maximum: 2,980W DC
Power input	2x redundant -48VDC to -58VDC

FortiGate-5050-R chassis

You can install up to five FortiGate-5000 series boards in the five slots of the FortiGate-5050 ATCA chassis. The FortiGate-5050 is a 5U 19-inch rackmount ATCA chassis that contains two redundant DC power connections that connect to -48 VDC Data Center DC power. The FortiGate-5050 chassis also includes a hot swappable cooling fan tray. If all five slots contain FortiGate-5005FA2, FortiGate-5001SX, or FortiGate-5001FA2 boards, the FortiGate-5050 chassis provides a total of 40 FortiGate gigabit ethernet interfaces. If all 5 slots contain FortiGate-5001A boards the FortiGate-5050 chassis supports ten 1-Gigabit ethernet FortiGate interfaces. If you add FortiGate-ADM-XB2 modules to the FortiGate-5001A boards the FortiGate-5050 chassis supports another ten 10-Gigabit interfaces.

You can also install a FortiSwitch-5003A or FortiSwitch-5003 board in the FortiGate-5050 chassis to provide base backplane communications. Base backplane communications can be used for HA heartbeat communications and for data communications. You can add a second FortiSwitch-5003A or FortiSwitch-5003 board for redundancy. FortiSwitch-5003A boards can also provide fabric backplane communication using the FortiGate-5050 fabric backplane channels.

You can mix and match any combination of FortiGate-5000 series boards in the FortiGate-5050 chassis. For example, you could install two FortiGate-5005FA2 boards, two FortiGate-5001SX boards, and one FortiGate-5001FA2 board. You can also install FortiController-5208 and FortiGate-5005FA2 boards in a FortiGate-5050 chassis to create a FortiGate-5005-DIST security system.

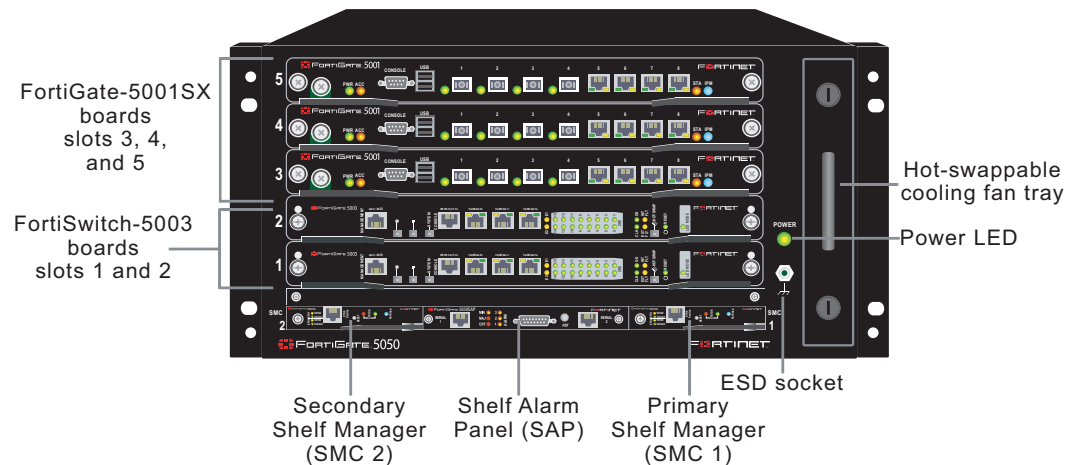
Some of the boards installed in a FortiGate-5050 chassis can be operating in a FortiGate HA cluster and some can be operating as standalone FortiGate units. You can also operate multiple HA clusters and standalone FortiGate units in a single FortiGate-5050 chassis. You can also use FortiSwitch-5003A or FortiSwitch-5003 boards to operate HA clusters consisting of FortiGate-5000 series boards installed in multiple FortiGate-5000 chassis. You can also use FortiSwitch-5003A boards for fabric data communication between chassis.

The FortiGate-5050 chassis requires -48VDC Data Center DC power. If DC power is not available you can install a FortiGate-5053 power converter tray (purchased separately) with FortiGate-5020/5050 power supplies.

FortiGate-5050 front panel

Figure 5 shows the front of a FortiGate-5050 chassis. Two FortiSwitch-5003 boards are installed in slots 1 and 2. Three FortiGate-5001SX boards are installed in slots 3, 4, and 5. The FortiGate-5050 primary and secondary Shelf Managers and the Shelf Alarm Panel (SAP) are also visible. The factory installed shelf alarm panel displays alarms, provides a telco alarm interface, and also provides serial connections to the shelf managers. The factory installed shelf managers provide power distribution, cooling, alarms, and shelf status for the FortiGate-5050 chassis.

Figure 5: FortiGate-5050 front panel with FortiGate-5001SX and FortiSwitch-5003 boards installed



Also visible on the front of the FortiGate-5050:

- The location of the hot swappable FortiGate-5050 cooling fan tray behind panel.
- Power LED.
- ESD socket, used for connecting an ESD wrist or ankle band when working with the chassis.



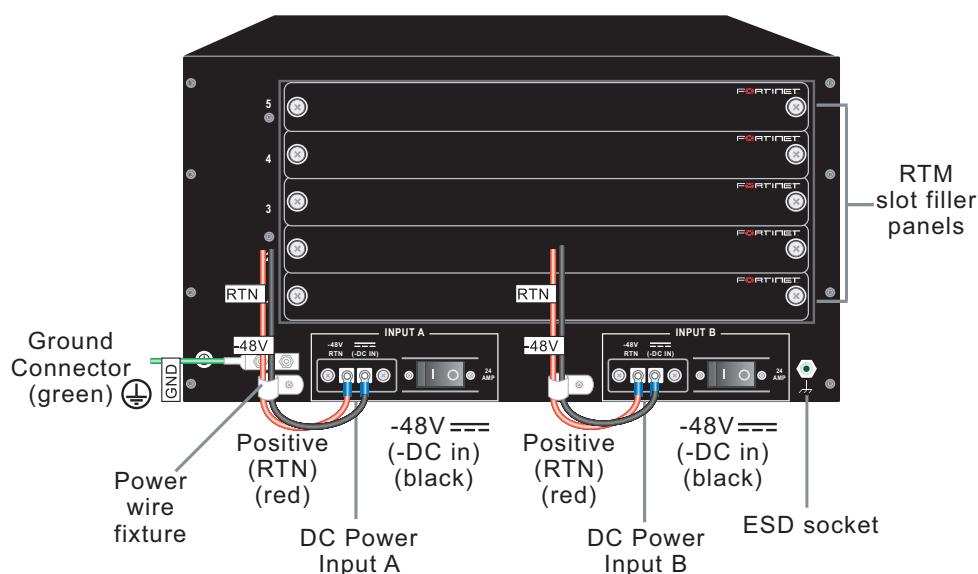
Caution: Do not operate the FortiGate-5050 chassis with open slots on the front panel. For optimum cooling performance and safety, the slots must contain a FortiGate-5000 series board or an air baffle slot filler. As well the removable power supply panel must be installed over the power connectors on the back of the chassis.

FortiGate-5050 back panel

Figure 6 shows the back of a FortiGate-5050 chassis. The FortiGate-5050 chassis back panel includes two redundant -48V to -58V DC power input connectors labelled Input A and Input B. The power input connectors provide redundant DC power connections for the FortiGate-5050 chassis and distribute DC power to the fan tray and the FortiGate-5000 series boards installed in the FortiGate-5050 chassis. Each power input connector includes a 24 Amp circuit breaker that also functions as an on/off switch for the power input connector.

If you require redundant power you should connect both power input connectors to DC power. If redundant power is not required, you should connect power input connector A to DC power. When operating, the power input connectors are covered with clear protection plates.

Figure 6: FortiGate-5050 chassis back panel



The back panel includes the FortiGate-5050 chassis ground connector which must be connected to Data Center ground. Use the power wire fixtures for securing and managing DC power wires. The FortiGate-5050 chassis also includes an ESD socket on the back panel.

Physical description of the FortiGate-5050 chassis

The FortiGate-5050 chassis is a 5U chassis that can be installed in a standard 19-inch rack. [Table 4](#) describes the physical characteristics of the FortiGate-5050 chassis.

Table 4: FortiGate-5050 chassis physical description

Dimensions	8.75 x 17 x 15.5 in. (13.3 x 43.2 x 39.4 cm) (H x W x D)
Shipping weight completely assembled with packaging	26.75 lb. (12.1 kg)
Operating environment	Temperature: 32 to 104°F (0 to 45°C)
	Relative humidity: 5 to 85% (Non-condensing)
Storage environment	Temperature: -13 to 158 °F (-25 to 70°C)
	Relative humidity: 5 to 95% (Non-condensing)
Power consumption	Maximum: 1,135 W
Power input	2x redundant -48VDC to -58VDC

FortiGate-5050 chassis

You can install up to five FortiGate-5000 series boards in the five slots of the FortiGate-5050 ATCA chassis. The FortiGate-5050 is a 5U 19-inch rackmount ATCA chassis that contains two redundant DC power connections that connect to -48 VDC Data Center DC power. The FortiGate-5050 chassis also includes a hot swappable cooling fan tray. If all five slots contain FortiGate-5005FA2, FortiGate-5001SX, or FortiGate-5001FA2 boards, the FortiGate-5050 chassis provides a total of 40 1-Gigabit ethernet FortiGate interfaces. If all 5 slots contain FortiGate-5001A boards the FortiGate-5050 chassis supports 10 1-Gigabit ethernet FortiGate interfaces. If you add FortiGate-ADM-XB2 modules to the FortiGate-5001A boards the FortiGate-5050 chassis supports up to ten 10-Gigabit interfaces

You can also install FortiSwitch-5003A or FortiSwitch-5003 boards in the FortiGate-5050 chassis slots 1 and 2 to provide base backplane communications. Base backplane communications can be used for HA heartbeat communications and data communications using FortiGate-5050 base backplane channels. You can add a second FortiSwitch-5003A or FortiSwitch-5003 board for redundancy. FortiSwitch-5003A boards can also provide fabric backplane communication using the FortiGate-5050 fabric backplane channels.

You can mix and match any combination of FortiGate-5000 series boards in the FortiGate-5050 chassis. For example, you could install two FortiGate-5005FA2 boards, two FortiGate-5001SX boards, and one FortiGate-5001FA2 board. You can also install FortiController-5208 and FortiGate-5005FA2 boards in a FortiGate-5050 chassis to create a FortiGate-5005-DIST security system.

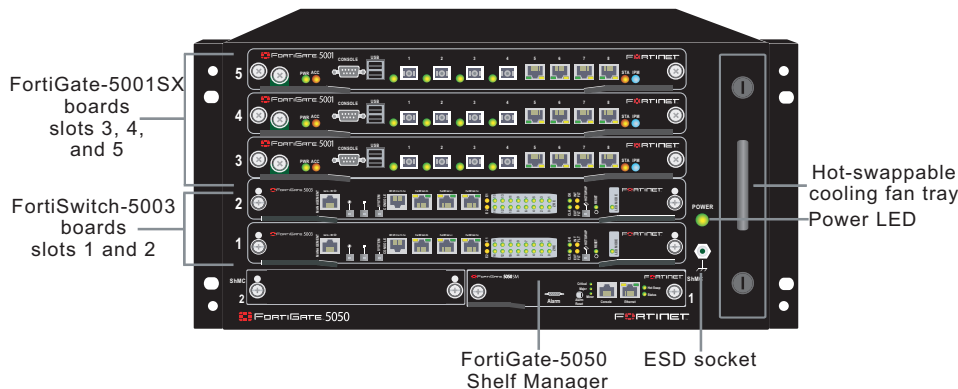
Some of the boards installed in a FortiGate-5050 chassis can be operating in a FortiGate HA cluster and some can be operating as standalone FortiGate units. You can also operate multiple HA clusters and standalone FortiGate units in a single FortiGate-5050 chassis. You can also use FortiSwitch-5003A or FortiSwitch-5003 boards to operate HA clusters consisting of FortiGate-5000 series boards installed in multiple FortiGate-5000 chassis. You can also use FortiSwitch-5003A boards for fabric data communication between chassis.

The FortiGate-5050 chassis requires -48VDC Data Center DC power. If DC power is not available you can install a FortiGate-5053 power converter tray (purchased separately) with FortiGate-5020/5050 power supplies.

FortiGate-5050 front panel

Figure 7 shows the front of a FortiGate-5050 chassis. Two FortiSwitch-5003 boards are installed in slots 1 and 2. Three FortiGate-5001SX boards are installed in slots 3, 4, and 5. The FortiGate-5050 primary Shelf Manager is also visible. The factory-installed shelf managers provide power distribution, cooling, alarms, shelf status, and a telco alarm interface for the FortiGate-5050 chassis.

Figure 7: FortiGate-5050 front panel with FortiGate-5001SX and FortiSwitch-5003 boards installed



Also visible on the front of the FortiGate-5050:

- Electrostatic discharge (ESD) socket, used for connecting an ESD wrist or ankle band when working with the chassis.
- The location of the hot swappable FortiGate-5050 cooling fan tray behind panel.
- Power LED.



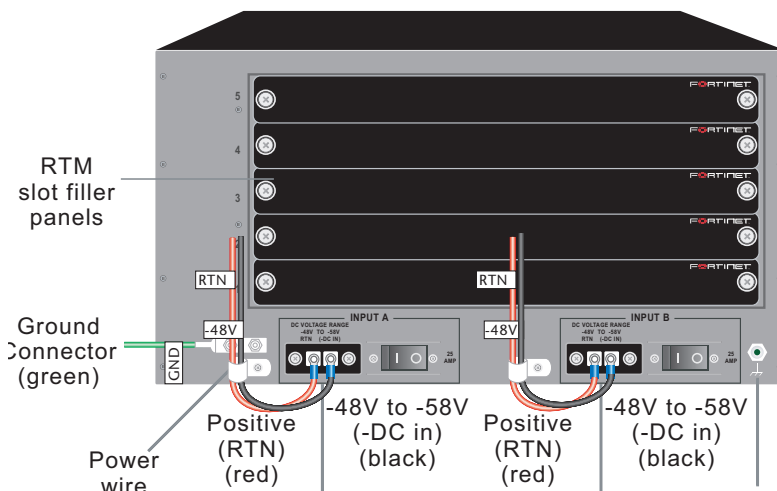
Caution: Do not operate the FortiGate-5050 chassis with open slots on the front panel. For optimum cooling performance and safety, the slots must contain a FortiGate-5000 series board or an air baffle slot filler. As well the removable power supply panel must be installed over the power connectors on the back of the chassis.

FortiGate-5050 back panel

Figure 8 shows the back panel of a FortiGate-5050 chassis. The back panel includes two redundant -48V to -58V DC power input connectors labelled Input A and Input B. The power input connectors provide redundant DC power connections for the FortiGate-5050 chassis and distribute DC power to the fan tray and the FortiGate-5000 series boards installed in the FortiGate-5050 chassis. Each power input connector includes a 24 Amp circuit breaker that also functions as an on/off switch for the power input connector.

If you require redundant power you should connect both power input connectors to DC power. If redundant power is not required, you should connect power input connector A to DC power. When operating, the power input connectors are covered with clear protection plates.

Figure 8: FortiGate-5050 chassis back panel



The back panel includes the FortiGate-5050 chassis ground connector which must be connected to Data Center ground. Use the power wire fixtures for securing and managing DC power wires. The FortiGate-5050 chassis also includes an ESD socket on the back panel.

The back panel also contains 5 RTM slots numbered to correspond to the front panel slots. The RTM slots are available for FortiGate-5000 RTM modules such as the FortiGate-RTM-XB2 module. When the FortiGate-5050 chassis is shipped, these slots are covered by RTM slot filler panels.

Physical description of the FortiGate-5050 chassis

The FortiGate-5050 chassis is a 5U chassis that can be installed in a standard 19-inch rack. [Table 5](#) describes the physical characteristics of the FortiGate-5050 chassis.

Table 5: FortiGate-5050 chassis physical description

Dimensions	8.75 x 17 x 15.5 in. (13.3 x 43.2 x 39.4 cm) (H x W x D)
Weight	26.75 lb. (12.1 kg)
Operating environment	Temperature: 32 to 104°F (0 to 45°C)
	Relative humidity: 5 to 85% (Non-condensing)
Storage environment	Temperature: -13 to 158 °F (-25 to 70°C)
	Relative humidity: 5 to 95% (Non-condensing)
Power consumption	Maximum: 1,135 W
Power input	2x redundant -48VDC to -58VDC

FortiGate-5020 chassis

You can install one or two FortiGate-5000 series boards in the two slots of the FortiGate-5020 ATCA chassis. The FortiGate-5020 is a 4U chassis that contains two redundant AC to DC power supplies that connect to AC power. The FortiGate-5020 chassis also includes an internal cooling fan tray. If both slots contain FortiGate-5000 boards, the FortiGate-5020 chassis provides up to 16 FortiGate gigabit ethernet interfaces.

If you install the same FortiGate-5000 series board in both slots, you can configure the boards to operate as an HA cluster. HA heartbeat communications between the boards uses the FortiGate-5020 base backplane communication channel. No extra switching or other connections are required.

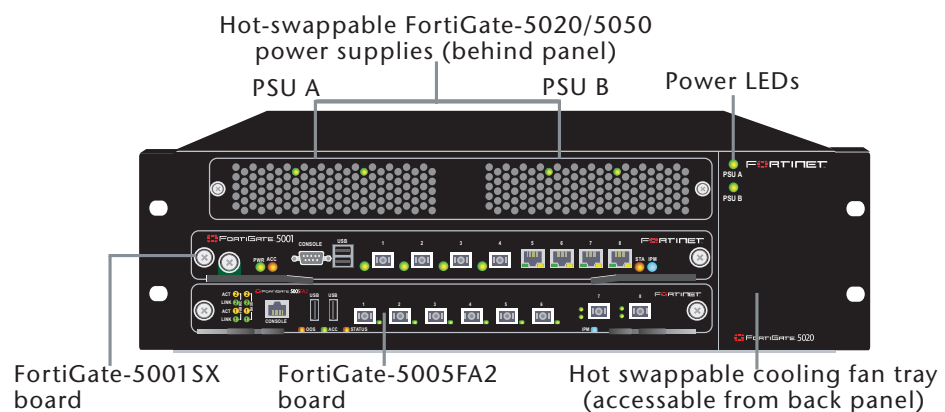
You can also use the base backplane channels for data communication between the FortiGate-5000 series boards installed in the FortiGate-5020 chassis. You can configure base backplane communication between two identical FortiGate-5000 series boards (for example between two FortiGate-5001SX boards) or between different FortiGate-5000 series boards (for example, between a FortiGate-5001SX and a FortiGate-5005FA2 board) as long as both boards use the same base backplane channel.

The FortiGate-5020 chassis can only be connected to AC power. Two redundant FortiGate-5020/5050 power supplies are factory installed in the FortiGate-5020 chassis.

FortiGate-5020 front panel

Figure 9 shows the front of a FortiGate-5020 chassis. A FortiGate-5001SX board and a FortiGate-5005FA2 board are installed. The FortiGate-5020/5050 power supplies are factory installed behind the panel at the top of the chassis. The power LEDs for the power supplies are visible on the front panel as well.

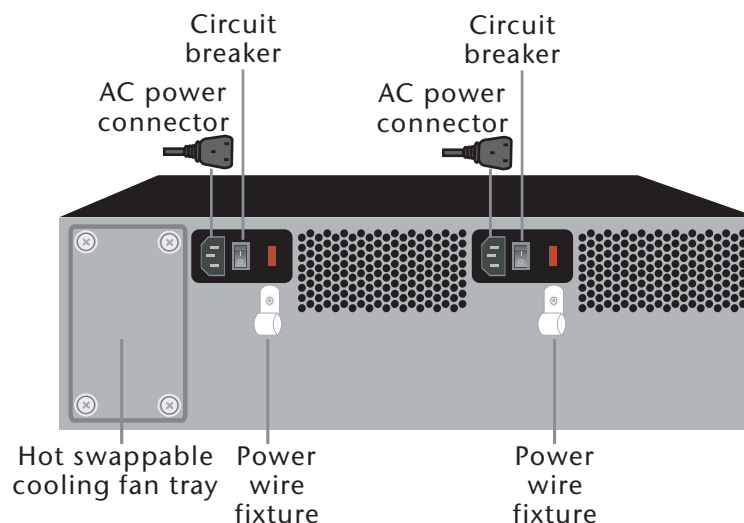
Figure 9: FortiGate-5020 front panel with two FortiGate series boards



FortiGate-5020 back panel

Figure 10 shows the back of a FortiGate-5020 chassis. The chassis back panel includes two redundant AC power connectors and provides access to the hot swappable cooling fan tray. Each AC power connector includes a 25 Amp circuit breaker that also functions as the on/off switch for the AC power connector. You can use the power wire fixtures to secure AC power wires to prevent the power wires from being accidentally disconnected.

Figure 10: FortiGate-5020 chassis back panel



Physical description of the FortiGate-5020 chassis

The FortiGate-5020 chassis is a 4U chassis that can be installed in a standard 19-inch rack. Table 6 describes the physical characteristics of the FortiGate-5020 chassis.

Table 6: FortiGate-5020 physical description

Dimensions	5.25 x 17 x 15.5 in. (13.3 x 43.2 x 39.4 cm) (H x W x D)
Weight	35.5 lb. (16.1 kg)
Operating environment	Temperature: -13 to 158 °F (-25 to 70°C)
	Relative humidity: 5 to 95% (Non-condensing)
Storage environment	Temperature: -20 to 80°C
	Relative humidity: 5 to 95% (Non-condensing)
Power dissipation	Maximum: 800 watts
Power input	2x redundant 110 to 250 VAC

FortiGate-5001A security system

The FortiGate-5001A security system is a high-performance Advanced Telecommunications Computing Architecture (ACTA) compliant FortiGate security system that can be installed in any ACTA chassis including the FortiGate-5140, FortiGate-5050, or FortiGate-5020 chassis.

Two FortiGate-5001A models are available:

- The FortiGate-5001A-DW (double-width) board includes a double-width Advanced Mezzanine Card (AMC) opening. You can install a supported FortiGate AMC Double width Module (ADM) such as the FortiGate-ADM-XB2 or the FortiGate-ADM-FB8 in the AMC opening. The FortiGate-ADM-XB2 adds two accelerated 10-gigabit interfaces to the FortiGate-5001A board and the FortiGate-ADM-FB8 adds 8 accelerated 1-gigabit interfaces.
- The FortiGate-5001A-SW (single-width) includes a single-width AMC opening. You can install a supported FortiGate AMC Single width Module (ASM) such as the FortiGate-ASM-FB4 or the FortiGate-ASM-S08 in the AMC opening. The FortiGate-ASM-FB4 adds four accelerated 1-gigabit interfaces to the FortiGate-5001A board and the FortiGate-ADM-S08 adds a removable hard disk that you can use to store log files and content archives.

Other than the double-width and single-width AMC openings, the FortiGate-5001A-DW and SW models have the same functionality and performance.

The FortiGate-5001A security system contains two front panel 1-gigabit ethernet interfaces, two base backplane 1-gigabit interfaces, and two fabric backplane 1-gigabit interfaces. Use the front panel interfaces for connections to your networks and the backplane interfaces for communication across the ACTA chassis backplane.

If you install a FortiGate-RTM-XB2 module for each FortiGate-5001A board, the FortiGate-5001A fabric interfaces can operate at 10 Gbps. The FortiGate-RTM-XB2 also provides NP2-accelerated network processing for eligible traffic passing through the FortiGate-RTM-XB2 interfaces.

You can also configure two or more FortiGate-5001A boards to create a high availability (HA) cluster using the base or fabric backplane interfaces for HA heartbeat communication through the chassis backplane, leaving front panel interfaces available for network connections.



Note: In most cases the base backplane interfaces are used for HA heartbeat communication and the fabric backplane interfaces are used for data communication.

The FortiGate-5001A board also supports high-end FortiGate features including 802.1Q VLANs, multiple virtual domains, 802.3ad aggregate interfaces, and FortiOS Carrier.

Figure 11: FortiGate-5001A-DW front panel

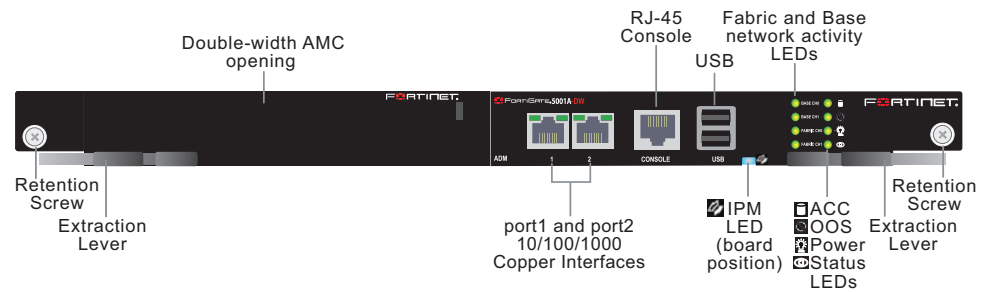
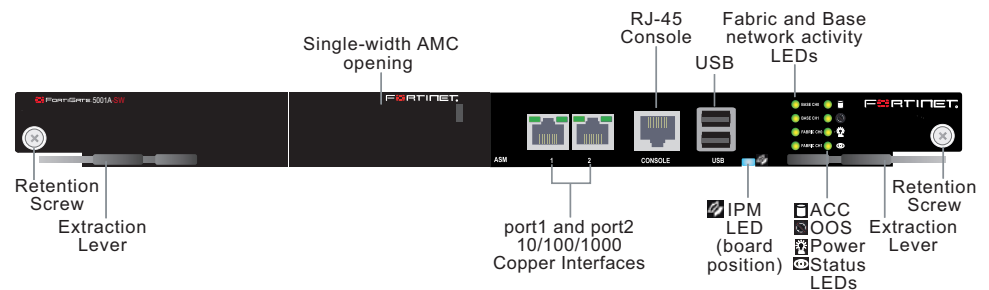


Figure 12: FortiGate-5001A-SW front panel



The FortiGate-5001A board includes the following features:

- Two front panel 10/100/1000Base-T copper 1-gigabit ethernet interfaces.
- Two base backplane 1-gigabit interfaces (base CH0 and Base CH1 on the front panel and base1 and base2 in the firmware) for HA heartbeat and data communications across the FortiGate-5000 chassis backplane.
- Two fabric backplane interfaces (Fabric CH0 and Fabric CH1 on the front panel and fabric1 and fabric2 in the firmware) for HA heartbeat and data communications across the FortiGate-5000 chassis backplane. The fabric backplane interfaces operate at 1 Gbps. If you install a FortiGate-RTM-XB2 module the fabric backplane interfaces operate at 10 Gbps.
- One double-width AMC opening (FortiGate-5001A-DW board).
- One single-width AMC opening (FortiGate-5001A-SW board).
- RJ-45 RS-232 serial console connection.
- 2 USB connectors.
- Mounting hardware.
- LED status indicators.






Front panel LEDs and connectors

From the FortiGate-5001A front panel you can view the status of the front panel LEDs to verify that the board is functioning normally. You also connect the FortiGate-5001A board to your network through the front panel 10/100/1000 ethernet connectors. The front panel also includes the RJ-45 console port for connecting to the FortiOS CLI and two USB ports. The USB ports can be used with any USB key for backing up and restoring configuration files. For information about using the using a USB key with a FortiGate unit, see the [FortiGate-5000 Series Firmware and FortiUSB Guide](#).

LEDs

Table 7 lists and describes the FortiGate-5001A LEDs.

Table 7: FortiGate-5001A LEDs

LED	State	Description
1, 2 (Left LED)	Green	The correct cable is connected to the interface and the connected equipment has power.
	Flashing Green	Network activity at the interface.
	Off	No link is established.
1, 2 (Right LED)	Green	Connection at 1 Gbps.
	Amber	Connection at 100 Mbps.
	Off	Connection at 10 Mbps.
Base CH0	Green	Base backplane interface 0 (base1) is connected at 1 Gbps.
	Flashing Green	Network activity at base backplane interface 0.
Base CH1	Green	Base backplane interface 1 (base2) is connected at 1 Gbps.
	Flashing Green	Network activity at base backplane interface 1.
Fabric CH0	Off	Fabric backplane interface 0 (fabric1) is connected at 10 Gbps.
	Flashing Green	Network activity at fabric backplane interface 0.
Fabric CH1	Off	Fabric backplane interface 1 (fabric2) is connected at 10 Gbps.
	Flashing Green	Network activity at fabric backplane interface 1.
 ACC	Off or Flashing green	The ACC LED flashes green when the FortiGate-5001A board accesses the FortiOS flash disk. The FortiOS flash disk stores the current FortiOS firmware build and configuration files. The system accesses the flash disk when starting up, during a firmware upgrade, or when an administrator is using the CLI or GUI to change the FortiOS configuration. Under normal operating conditions this LED flashes occasionally, but is mostly off.
 OOS (Out of Service)	Off	Normal operation.
	Green	A fault condition exists and the FortiGate-5001A blade is out of service (OOS). This LED may also flash very briefly during normal startup.
 Power	Green	The FortiGate-5001A board is powered on.
 Status	Off	The FortiGate-5001A board is powered on.
	Flashing Green	The FortiGate-5001A is starting up. If this LED is flashing at any time other than system startup, a fault condition may exist.
 IPM	Blue	The FortiGate-5001A is ready to be hot-swapped (removed from the chassis). If the IPM light is blue and no other LEDs are lit the FortiGate-5001A board has lost power
	Flashing Blue	The FortiGate-5001A is changing from hot swap to running mode or from running mode to hot swap. This happens when the FortiGate-5001A board is starting up or shutting down.
	Off	Normal operation. The FortiGate-5001A board is in contact with the chassis backplane.

Connectors

Table 8 lists and describes the FortiGate-5001A connectors.

Table 8: FortiGate-5001A connectors

Connector	Type	Speed	Protocol	Description
1, 2	RJ-45	10/100/1000 Base-T	Ethernet	Copper 1-gigabit connection to 10/100/1000Base-T copper networks.
CONSOLE	RJ-45	9600 bps 8/N/1	RS-232 serial	Serial connection to the command line interface.
USB	USB			FortiUSB key firmware updates and configuration backup.

Base backplane communication

The FortiGate-5001A base backplane 1-gigabit interfaces can be used for HA heartbeat communication between FortiGate-5001A boards installed in the same or in different FortiGate-5000 chassis. You can also configure FortiGate-5001A boards to use the base backplane interfaces for data communication between FortiGate boards. To support base backplane communications your FortiGate-5140 or FortiGate-5050 chassis must include one or more FortiSwitch-5003 boards, FortiSwitch-5003A boards, or other 1-gigabit base backplane switching boards installed in the chassis in base slots 1 and 2. The FortiGate-5020 chassis supports base backplane communication with no additions or changes to the chassis.

For information about base backplane communication in FortiGate-5140 and FortiGate-5050 chassis, see the [FortiGate-5000 Backplane Communication Guide](#). For information about the FortiSwitch-5003 board, see the [FortiSwitch-5003 System Guide](#). For information about the FortiSwitch-5003A board, see the [FortiSwitch-5003A System Guide](#).

Fabric backplane communication

The FortiGate-5001A fabric backplane interfaces can be used for data communication or HA heartbeat communication between FortiGate-5001A boards installed in the same or in different FortiGate-5000 chassis. To support 1-gigabit fabric backplane communications your FortiGate-5140 or FortiGate-5050 chassis must include one or more FortiSwitch-5003A boards or other 1-gigabit fabric backplane switching boards installed in the chassis in fabric slots 1 and 2. The FortiGate-5020 chassis does not support fabric backplane communications.

For information about fabric backplane communication in FortiGate-5140 and FortiGate-5050 chassis, see the [FortiGate-5000 Backplane Communication Guide](#). For information about the FortiSwitch-5003A board, see the [FortiSwitch-5003A System Guide](#).

FortiGate-RTM-XB2

The FortiGate-RTM-XB2 module provides two 10-gigabit fabric backplane interfaces and NP2 processor acceleration for FortiGate-5001A fabric interfaces. For 10-gigabit fabric backplane communications, each FortiGate-5001A board requires one FortiGate-RTM-XB2 module. The FortiGate-RTM-XB2 module is an ATCA rear transition module (RTM) that installs into an RTM slot at the back of a FortiGate-5140 and FortiGate-5050 chassis.

To support 10-gigabit fabric backplane communications your FortiGate-5140 or FortiGate-5050 chassis must also include one or more FortiSwitch-5003A boards or other 10-gigabit fabric backplane switching boards installed in the chassis in fabric slots 1 and 2.



Note: On some versions of the FortiGate-5001A firmware, when a FortiGate-5001A board starts up with a FortiGate-RTM-XB2 module installed, the fabric1 and fabric2 interfaces are replaced with interfaces that are named RTM/1 and RTM/2 to indicate the presence of the FortiGate-RTM-XB2 module. Configuration settings that include the fabric1 and fabric2 interface names will have to be changed to use the RTM/1 and RTM/2 interface names.

Figure 13: FortiGate-RTM-XB2 front panel



The FortiGate-RTM-XB2 NP2 processors provide hardware accelerated network processing for eligible traffic passing through the FortiGate-RTM-XB2 interfaces. For information about Fortinet NP2 processor acceleration, see the [Fortinet Hardware Acceleration Technical Note](#).

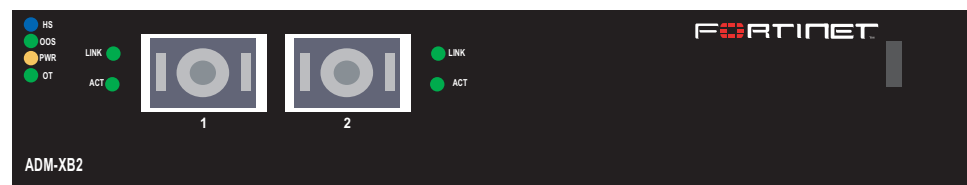
Follow the instructions in the [FortiGate-RTM-XB2 System Guide](#) to install the FortiGate-RTM-XB2 module.

AMC modules

You can install one FortiGate AMC Double width Module (ADM) in the FortiGate-5001A-DW front panel AMC double-width opening. For example:

- The FortiGate-ADM-XB2, provides 2 NP2 accelerated XFP 10-gigabit interfaces.
- The FortiGate-ADM-FB8, provides 8 NP2 accelerated SFP 1-gigabit interfaces.

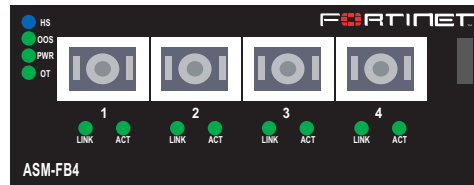
Figure 14: FortiGate-ADM-XB2



You can install one FortiGate AMC Single width Module (ASM) in the FortiGate-5001A-SW front panel AMC single-width opening. For example:

- The FortiGate-ASM-FB4, provides 4 NP2 accelerated SFP 1-gigabit interfaces.
- The FortiGate-ASM-S08, provides adds a removable hard disk that you can use to store log files and content archives.

Figure 15: FortiGate-ASM-FB4



Note: You can operate a FortiGate-5001A board with both a FortiGate-RTM-XB2 module and a supported FortiGate AMC module installed at the same time.

FortiGate-RTM-XB2 system

The FortiGate-RTM-XB2 system provides two 10-gigabit fabric backplane interfaces and NP2 processor acceleration for FortiGate-5001A boards installed in FortiGate-5140 and FortiGate-5050 chassis.

The FortiGate-RTM-XB2 is an ATCA rear transition module (RTM) that installs into an RTM slot at the back of a FortiGate-5140 and FortiGate-5050 chassis. You must install one FortiGate-RTM-XB2 module for each FortiGate-5001A board. Each chassis front panel slot has a corresponding RTM slot. The FortiGate-RTM-XB2 module must be installed in the RTM slot that corresponds to the front panel slot in which you will install a FortiGate-5001A board. For example, if the FortiGate-5001A board will be installed in front panel slot 3, install the FortiGate-RTM-XB2 module for this board in RTM slot 3.



Caution: To avoid damaging components, you should install the FortiGate-RTM-XB2 module first before you install the corresponding FortiGate-5001A board. If you have already installed the FortiGate-5001A board, you should remove it before installing the FortiGate-RTM-XB2 module. Except for this limitation, FortiGate-RTM-XB2 modules are hot swappable.

The FortiGate-RTM-XB2 NP2 processors provide hardware accelerated network processing for eligible traffic passing through the FortiGate-RTM-XB2 interfaces. Each FortiGate-RTM-XB2 interface is connected to an NP2 processor and the NP2 processors are connected by an Enhanced Extension Interface (EEI). The FortiGate-RTM-XB2 can accelerate eligible traffic that enters and exits the same FortiGate-RTM-XB2 interface or that enters one FortiGate-RTM-XB2 interface and exits the other. For more information about Fortinet NP2 processor acceleration, see the [Fortinet Hardware Acceleration Technical Note](#).

Figure 16: FortiGate-RTM-XB2 front panel



The FortiGate-RTM-XB2 module includes the following features:

- Two fabric backplane 10-gigabit interfaces for 10-gigabit data communications across a FortiGate-5000 chassis backplane.
- Two NP2 processors connected by an Enhanced Extension Interface (EEI) that provide hardware accelerated network processing.
- Mounting hardware.
- Power LED.



Note: On some versions of the FortiGate-5001A firmware, when a FortiGate-5001A board starts up with a FortiGate-RTM-XB2 module installed, the fabric1 and fabric2 interfaces are replaced with interfaces that are named RTM/1 and RTM/2 to indicate the presence of the FortiGate-RTM-XB2 module. Configuration settings that include the fabric1 and fabric2 interface names will have to be changed to use the RTM/1 and RTM/2 interface names.

Front panel LED

From the FortiGate-RTM-XB2 font panel includes a power LED.

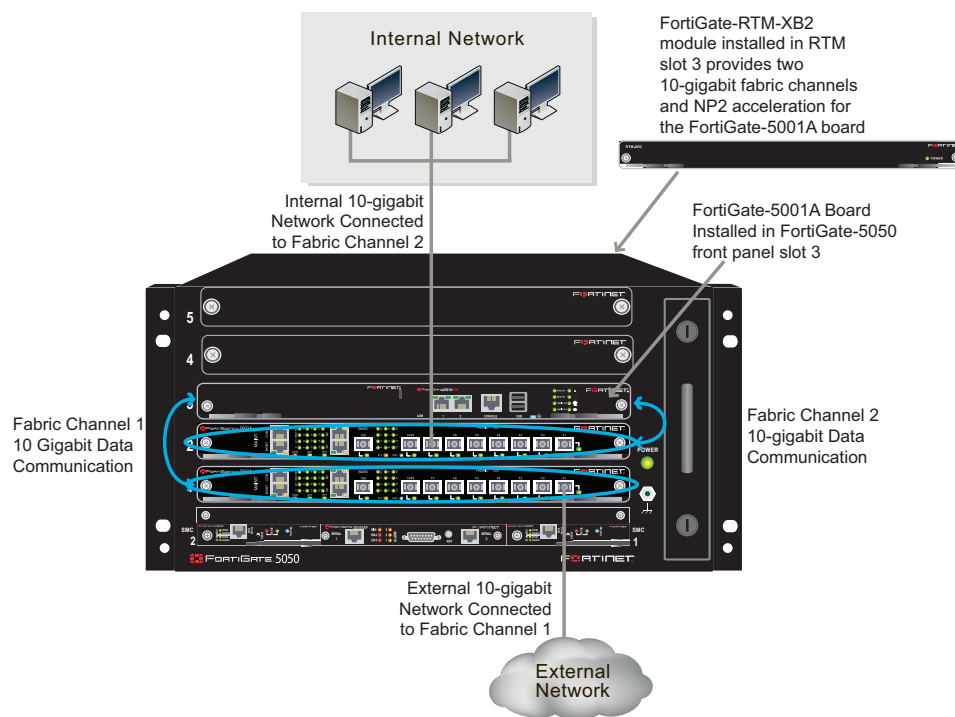
Table 9: FortiGate-RTM-XB2 power LED

LED	State	Description
Power	Green	The FortiGate-RTM-XB2 module is powered on and properly connected to a FortiGate-5001A board.

Fabric backplane 10-gigabit communication

The FortiGate-RTM-XB2 module is used for fabric backplane 10-gigabit data communication. To support fabric backplane communications your FortiGate-5140 or FortiGate-5050 chassis must include one or more 10-gigabit switch modules (such as the FortiSwitch-5003A) installed in chassis slots 1 and 2. The FortiGate-5020 chassis does not support fabric backplane communications.

Figure 17: Example FortiGate-RTM-XB2 configuration



FortiGate-5005FA2 security system

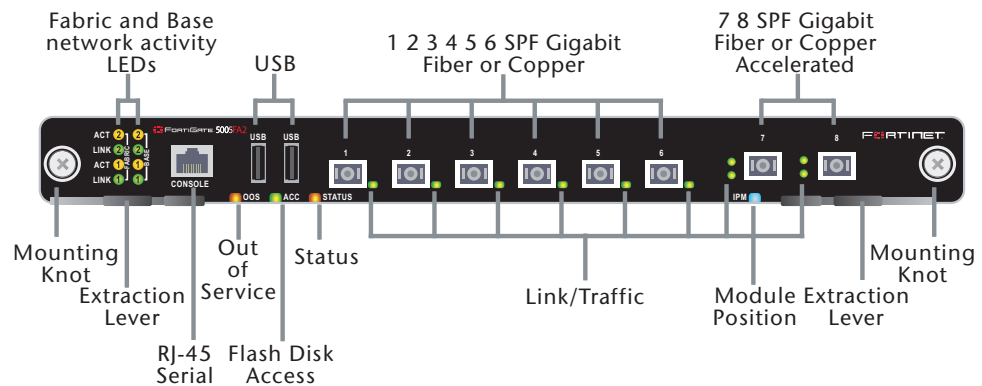
The FortiGate-5005FA2 security system is a high-performance FortiGate security system with a total of 8 front panel gigabit ethernet interfaces, two base backplane interfaces, and two fabric backplane interfaces. Use the front panel interfaces for connections to your networks and the backplane interfaces for communication between FortiGate-5000 series boards over the FortiGate-5000 chassis backplane.

You can also configure two or more FortiGate-5005FA2 boards to create a high availability (HA) cluster using the base backplane interfaces for HA heartbeat communication through the chassis backplane, leaving all eight front panel gigabit interfaces available for network connections.

FortiGate-5005FA2 front panel interfaces 7 and 8 also include accelerated packet forwarding and policy enforcement for faster small packet performance. Using backplane base and fabric interfaces, the FortiGate-5005FA2 also functions as the worker board in a FortiGate-5005-DIST security system.

The FortiGate-5005FA2 board also supports high-end FortiGate features including 802.1Q VLANs, multiple virtual domains, 802.3ad aggregate interfaces, and FortiGate-5000 chassis monitoring.

Figure 18: FortiGate-5005FA2 front panel



The FortiGate-5005FA2 board includes the following features:

- A total of eight front panel gigabit interfaces that can accept Small Formfactor Pluggable (SFP) fiber or copper gigabit transceivers.
 - Six standard gigabit interfaces (interfaces 1 to 6).
 - Two accelerated packet forwarding and policy enforcement gigabit interfaces (interfaces 7 and 8).
- Two fabric backplane gigabit interfaces (fabric1 and fabric2) for FortiGate-5005-DIST security system management communications. The fabric backplane gigabit interfaces can also be used for data communications across the FortiGate-5000 chassis backplane if combined with a board that supports backplane fabric switching.
- Two base backplane gigabit interfaces (base1 and base2) for HA heartbeat and data communications across the FortiGate-5000 chassis backplane and for FortiGate-5005-DIST security system data communication.
- RJ-45 RS-232 serial console connection.

- 2 USB connectors.
- Mounting hardware.
- LED status indicators.

The FortiGate-5005FA2 board comes supplied with fiber and copper SFP transceivers. You can order the SFP transceivers in any combination. Before you can connect any FortiGate-5005FA2 front panel interfaces, you must insert the SFP transceivers into the FortiGate-5005FA2 front panel cage slots.

Front panel LEDs and connectors

From the FortiGate-5005FA2 front panel you can view the status of the front panel LEDs to verify that the board is functioning normally. You also connect the FortiGate-5005FA2 board to your network through the front panel ethernet connectors. The front panel also includes the RJ-45 console port for connecting to the FortiOS CLI and two USB ports. The USB ports can be used with a Fortinet USB key. For information about using the FortiUSB key, see the [FortiGate-5000 Series Firmware and FortiUSB Guide](#).

LEDs

Table 10 lists and describes the FortiGate-5005FA2 board LEDs.

Table 10: FortiGate-5005FA2 board LEDs

LED	State	Description
Fabric	ACT 2	Amber Network activity at backplane fabric interface 2.
	LINK 2	Green Backplane fabric interface 2 is connected at 1000 Mbps.
	ACT 1	Amber Network activity at backplane fabric interface 1.
	LINK 1	Green Backplane fabric interface 1 is connected at 1000 Mbps.
Base	ACT 2	Amber Network activity at backplane base interface 2 (backplane2).
	LINK 2	Green Backplane base interface 2 (backplane2) is connected at 1000 Mbps.
	ACT 1	Amber Network activity at backplane base interface 1 (backplane1).
	LINK 1	Green Backplane base interface 1 (backplane1) is connected at 1000 Mbps.
OOS (Out of Service)	Off	Normal operation.
	Red	A fault condition exists and the FortiGate-5005FA2 blade is out of service (OOS). This LED may also flash very briefly during normal startup.
ACC	Off or Flashing green	The ACC LED flashes green when the FortiGate-5005FA2 board accesses the FortiOS flash disk. The FortiOS flash disk stores the current FortiOS firmware build and configuration files. The system accesses the flash disk when starting up, during a firmware upgrade, or when an administrator is using the CLI or GUI to change the FortiOS configuration. Under normal operating conditions this LED flashes occasionally, but is mostly off.
STATUS	Amber	The FortiGate-5005FA2 board is powered on.

Table 10: FortiGate-5005FA2 board LEDs (Continued)

LED	State	Description
IPM	Blue	The FortiGate-5005FA2 is ready to be hot-swapped (removed from the chassis). If the IPM light is blue and no other LEDs are lit the FortiGate-5005FA2 board has lost power
	Flashing Blue	The FortiGate-5005FA2 is changing from hot swap to running mode or from running mode to hot swap.
	Off	Normal operation. The FortiGate-5005FA2 board is in contact with the chassis backplane.
1, 2, 3, 4, 5, 6, 7, 8	Green	The correct cable is connected to the gigabit SFP interface.
	Flashing	Network activity at the gigabit SFP interface.

Connectors

Table 11 lists and describes the FortiGate-5005FA2 connectors.

Table 11: FortiGate-5005FA2 connectors

Connector	Type	Speed	Protocol	Description
1, 2, 3, 4, 5, 6	LC SFP	1000Base-SX	Ethernet	Six gigabit SFP interfaces that can accept fiber or copper gigabit transceivers. These interfaces only operate at 1000Mbps.
7, 8	LC SFP	1000Base-SX	Ethernet	Two accelerated gigabit SFP interfaces that can accept fiber or copper gigabit transceivers. These interfaces only operate at 1000Mbps. The accelerated interface connectors are inverted compared to connectors 1 to 6.
CONSOLE	RJ-45	9600 bps 8/N/1	RS-232 serial	Serial connection to the command line interface.
USB	USB			FortiUSB key firmware updates and configuration backup.

Accelerated packet forwarding and policy enforcement

FortiGate-5005FA2 Accelerated packet forwarding and policy enforcement results in accelerated small packet performance required for voice, video, and other multimedia streaming applications. The following traffic scenarios are recommended for the accelerated interfaces:

- Small packet applications, such as voice over IP (VoIP).
The FortiGate-5005FA2 accelerated interfaces provide wire speed performance for small packet applications.
- Latency sensitive applications, such as multimedia.
The FortiGate-5005FA2 accelerated interfaces add much less latency than normal (non-accelerated) interfaces.
- Session Oriented Traffic with long session lifetime, such as FTP sessions.
Packet size does not affect performance for traffic with long session lifetime. For long sessions, processing that would otherwise be handled by the FortiGate-5005FA2 CPUs is off-loaded to the acceleration module.

- Firewall and intrusion protection (IPS), when there is a reasonable percentage of P2P packets.
- Firewall, intrusion protection (IPS), and antivirus, when there is a reasonable percentage of P2P packets.
- Firewall and IPSec VPN applications.

The following traffic scenarios should be handled by the normal (or non-accelerated) FortiGate-5005FA2 interfaces:

- Session oriented traffic when the session lifetime is very short.
- Firewall and antivirus only applications.

Traffic will not be off-loaded to the FortiGate-5005FA2 accelerator module. The result will be high CPU usage because of the high CPU requirement for antivirus scanning.

FA2 interfaces and active-active HA performance

FortiOS v3.0 MR4 firmware can also use FA2 acceleration to improve active-active HA load balancing performance. See the [FortiGate HA Overview](#) or the [FortiGate HA Guide](#) for more information.

Base backplane gigabit communication

The FortiGate-5005FA2 base1 and base2 backplane gigabit interfaces can be used for HA heartbeat communication between FortiGate-5005FA2 boards installed in the same or in different FortiGate-5000 chassis. You can also configure FortiGate-5005FA2 boards to use the base backplane interfaces for data communication between FortiGate boards. To support base backplane communications your FortiGate-5140 or FortiGate-5050 chassis must include one or more FortiSwitch-5003 boards. FortiSwitch-5003 boards are installed in chassis slots 1 and 2. The FortiGate-5020 chassis supports base backplane communication with no additions or changes to the chassis.

For information about base backplane communication in FortiGate-5140 and FortiGate-5050 chassis, see the [FortiGate-5000 Base Backplane Communication Guide](#). For information about the FortiSwitch-5003 board, see the [FortiSwitch-5003 Guide](#).

FortiGate-5005-DIST security system

You can install FortiGate-5005FA2 boards as worker boards in a FortiGate-5005-DIST security system. Worker boards apply FortiGate security system functionality such as applying firewall policies, virus scanning, IPS and routing to distributed traffic.

For complete information about the FortiGate-5005-DIST security system and the role of worker boards, see the [FortiGate-5005-DIST Security System Administration Guide](#).

FortiGate-5001FA2-LENC security system

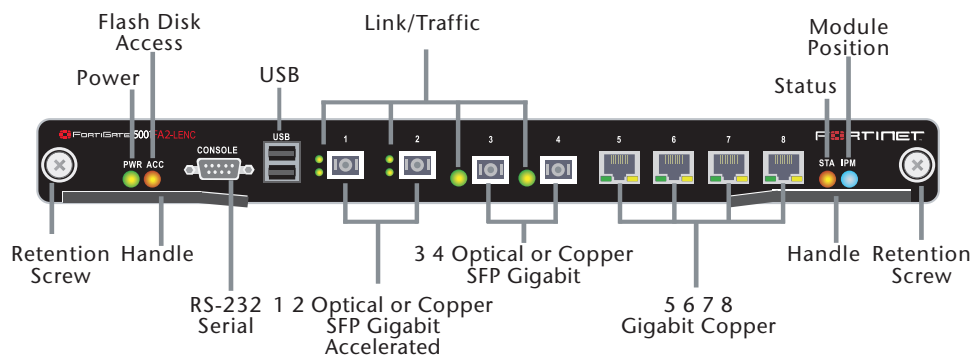
The FortiGate-5001FA2-LENC security system is a high-performance FortiGate security system with a total of 8 front panel gigabit ethernet interfaces and two base backplane interfaces. Use the front panel interfaces for connections to your networks and the backplane interfaces for communication between FortiGate-5000 series boards over the FortiGate-5000 chassis backplane.

You can also configure two or more FortiGate-5001FA2-LENC boards to create a high availability (HA) cluster using the base backplane interfaces for HA heartbeat communication through chassis backplane, leaving all eight front panel gigabit interfaces available for network connections.

FortiGate-5001FA2-LENC front panel interfaces 1 and 2 also include accelerated packet forwarding and policy enforcement for faster small packet performance.

The FortiGate-5001FA2-LENC board also supports high-end FortiGate features including 802.1Q VLANs, multiple virtual domains, 802.3ad aggregate interfaces, and FortiGate-5000 chassis monitoring.

Figure 19: FortiGate-5001FA2-LENC front panel



The FortiGate-5001FA2-LENC board includes the following features:

- A total of eight front panel gigabit interfaces
 - Two accelerated packet forwarding and policy enforcement gigabit interfaces that can accept optical Small Formfactor Pluggable (SFP) or copper SFP gigabit transceivers (interfaces 1 and 2)
 - Two gigabit interfaces that can accept optical or copper SFP gigabit transceivers (interfaces 3 and 4)
 - Four 10/100/1000Base-T gigabit copper network interfaces (interfaces 5, 6, 7, 8)
- Two base backplane gigabit interfaces (port9 and port10) for HA heartbeat and data communications across the FortiGate-5000 chassis backplane.
- DB-9 RS-232 serial console connection
- One USB connector

- Mounting hardware
- LED status indicators

The FortiGate-5001FA2-LENC board comes supplied with four optical or four copper SFP transceivers. Before you can connect FortiGate-5001FA2-LENC interfaces 1 to 4, you must insert the SFP transceivers into the FortiGate-5001FA2-LENC front panel cage slots numbered 1 to 4.

The FortiGate-5001FA2-LENC board ships with two RAM DIMMs installed on the FortiGate-5001FA2-LENC circuit board. You should confirm that the RAM DIMMs are installed correctly before inserting the FortiGate-5001FA2-LENC board into a chassis.

Front panel LEDs and connectors

From the FortiGate-5001FA2-LENC front panel you can view the status of the front panel LEDs to verify that the board is functioning normally. You also connect the FortiGate-5001FA2-LENC board to your network through the front panel ethernet connectors. The front panel also includes the RS-232 console port for connecting to the FortiOS CLI and a USB port. The USB port can be used with a Fortinet USB key. For information about using the FortiUSB key, see the [FortiGate-5000 Series Firmware and FortiUSB Guide](#).

LEDs

[Table 12](#) lists and describes the FortiGate-5001FA2-LENC board LEDs.

Table 12: FortiGate-5001FA2-LENC board LEDs

LED	State	Description
PWR	Green	The FortiGate-5001FA2 board is powered on.
ACC	Off or Flashing red	The ACC LED flashes red when the FortiGate-5001FA2-LENC board accesses the FortiOS flash disk. The FortiOS flash disk stores the current FortiOS firmware build and configuration files. The system accesses the flash disk when starting up, during a firmware upgrade, or when an administrator is using the CLI or GUI to change the FortiOS configuration. Under normal operating conditions this LED flashes occasionally, but is mostly off.
STA	Green	Normal operation.
	Red	The FortiGate-5001FA2-LENC is booting or a fault condition exists.
IPM	Blue	The FortiGate-5001FA2-LENC is ready to be hot-swapped (removed from the chassis). If the IPM light is blue and no other LEDs are lit the FortiGate-5001FA2-LENC board has lost power, possibly because of a loose or incorrectly aligned left handle.
	Flashing Blue	The FortiGate-5001FA2-LENC is changing from hot swap to running mode or from running mode to hot swap.
	Off	Normal operation. The FortiGate-5001FA2-LENC board is in contact with the chassis backplane.
1, 2, 3, 4	Green	The correct cable is connected to the gigabit SFP interface.
	Flashing	Network activity at the gigabit SFP interface.

Table 12: FortiGate-5001FA2-LENC board LEDs (Continued)

LED		State	Description
5, 6, 7, 8	Link LED	Green	The correct cable is inserted into this interface and the connected equipment has power.
		Flashing	Network activity at this interface.
	Speed LED	Green	The interface is connected at 1000 Mbps.
		Amber	The interface is connected at 100 Mbps.
		Unlit	The interface is connected at 10 Mbps.

Connectors

Table 13 lists and describes the FortiGate-5001FA2-LENC connectors.

Table 13: FortiGate-5001FA2-LENC connectors

Connector	Type	Speed	Protocol	Description
1 and 2	LC SFP	1000Base-SX	Ethernet	Two accelerated gigabit SFP interfaces that can accept optical or copper gigabit transceivers. These interfaces only operate at 1000Mbps. The accelerated interface connectors are inverted compared to connectors 3 and 4.
3 and 4	LC SFP	1000Base-SX	Ethernet	Two gigabit SFP interfaces that can accept optical or copper gigabit transceivers. These interfaces only operate at 1000Mbps.
5, 6, 7, 8	RJ-45	10/100/1000 Base-T	Ethernet	Copper gigabit connection to 10/100/1000Base-T copper networks.
CONSOLE	DB-9	9600 bps 8/N/1	RS-232 serial	Serial connection to the command line interface.
USB	USB			FortiUSB key firmware updates and configuration backup.

Accelerated packet forwarding and policy enforcement

FortiGate-5001FA2-LENC Accelerated packet forwarding and policy enforcement results in accelerated small packet performance required for voice, video, and other multimedia streaming applications. The following traffic scenarios are recommended for the accelerated interfaces:

- Small packet applications, such as voice over IP (VoIP).
The FortiGate-5001FA2-LENC accelerated interfaces provide wire speed performance for small packet applications.
- Latency sensitive applications, such as multimedia.
The FortiGate-5001FA2-LENC accelerated interfaces add much less latency than normal (non-accelerated) interfaces.
- Session Oriented Traffic with long session lifetime, such as FTP sessions.
Packet size does not affect performance for traffic with long session lifetime. For long sessions, processing that would otherwise be handled by the FortiGate-5001FA2-LENC CPUs is off-loaded to the acceleration module.
- Firewall and intrusion protection (IPS), when there is a reasonable percentage of P2P packets.

- Firewall, intrusion protection (IPS), and antivirus, when there is a reasonable percentage of P2P packets.
- Firewall and IPsec VPN applications.

The following traffic scenarios should be handled by the normal (or non-accelerated) FortiGate-5001FA2-LENC interfaces:

- Session oriented traffic when the session lifetime is very short.
- Firewall and antivirus only applications.

Traffic will not be off-loaded to the FortiGate-5001FA2-LENC accelerator module. The result will be high CPU usage because of the high CPU requirement for antivirus scanning.

FA2 interfaces and active-active HA performance

FortiOS v3.0 MR4 firmware can also use FA2 acceleration to improve active-active HA load balancing performance. See the [FortiGate HA Overview](#) or the [FortiGate HA Guide](#) for more information.

Base backplane gigabit communication

The FortiGate-5001FA2-LENC port9 and port10 base backplane gigabit interfaces can be used for HA heartbeat communication between FortiGate-5001FA2-LENC boards installed in the same or in different FortiGate-5000 chassis. You can also configure FortiGate-5001FA2-LENC boards to use the base backplane interfaces for data communication between FortiGate boards. To support base backplane communications your FortiGate-5140 or 5050 chassis must include one or more FortiSwitch-5003 boards. FortiSwitch-5003 boards are installed in chassis slots 1 and 2. The FortiGate-5020 chassis supports base backplane communication with no additions or changes to the chassis.

For information about base backplane communication in FortiGate-5140 and FortiGate-5050 chassis, see the [FortiGate-5000 Base Backplane Communication Guide](#). For information about the FortiSwitch-5003 board, see the [FortiSwitch-5003 Guide](#).

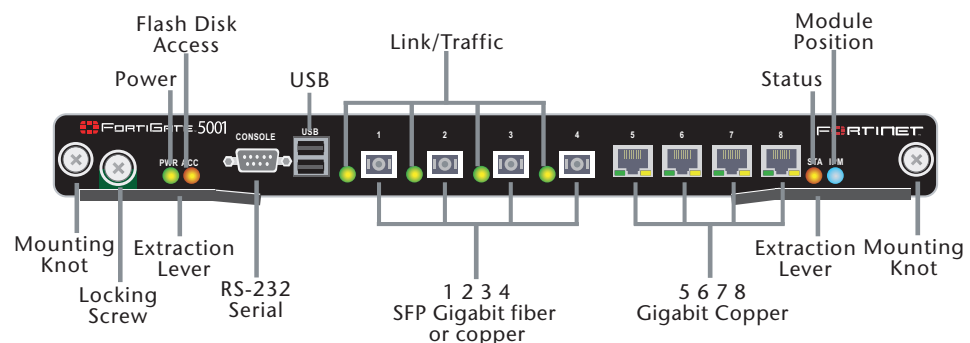
FortiGate-5001SX security system

The FortiGate-5001SX security system is a high-performance FortiGate security system with a total of 8 front panel gigabit ethernet interfaces and two base backplane interfaces. Use the front panel interfaces for connections to your networks and the backplane interfaces for communication between FortiGate-5000 series boards over the FortiGate-5000 chassis backplane.

You can also configure two or more FortiGate-5001SX boards to create a high availability (HA) cluster using the base backplane interfaces for HA heartbeat communication through chassis backplane, leaving all eight front panel gigabit interfaces available for network connections.

The FortiGate-5001SX board also supports high-end FortiGate features including 802.1Q VLANs, multiple virtual domains, 802.3ad aggregate interfaces, and FortiGate-5000 chassis monitoring.

Figure 20: FortiGate-5001SX front panel



The FortiGate-5001SX board includes the following features:

- A total of eight front panel gigabit interfaces
 - Four gigabit interfaces that can accept Small Formfactor Pluggable (SFP) fiber or copper transceivers (interfaces 1, 2, 3, and 4)
 - Four 10/100/1000Base-T gigabit copper network interfaces (interfaces 5, 6, 7, and 8)
- Two base backplane gigabit interfaces (port9 and port10) for HA heartbeat and data communications across the FortiGate-5000 chassis backplane.
- DB-9 RS-232 serial console connection
- One USB connector
- Mounting hardware
- LED status indicators

The FortiGate-5001SX board comes supplied with four fiber or four copper SFP transceivers. Before you can connect FortiGate-5001SX interfaces 1 to 4, you must insert the SFP transceivers into the FortiGate-5001SX front panel cage slots numbered 1 to 4.

The FortiGate-5001SX board ships with two RAM DIMMs installed on the FortiGate-5001SX circuit board. You should confirm that the RAM DIMMs are installed correctly before inserting the FortiGate-5001SX board into a chassis.

Front panel LEDs and connectors

From the FortiGate-5001SX front panel you can view the status of the front panel LEDs to verify that the board is functioning normally. You also connect the FortiGate-5001SX board to your network through the front panel ethernet connections. The front panel also includes the RS-232 console port for connecting to the FortiOS CLI and a USB port. The USB port can be used with a Fortinet USB key. For information about using the FortiUSB key, see the [FortiGate-5000 Series Firmware and FortiUSB Guide](#).

LEDs

Table 14 lists and describes the FortiGate-5001SX board LEDs.

Table 14: FortiGate-5001SX LEDs

LED	State	Description	
PWR	Green	The FortiGate-5001SX board is powered on.	
ACC	Off or Flashing red	The ACC LED flashes red when the FortiGate-5001SX board accesses the FortiOS flash disk. The FortiOS flash disk stores the current FortiOS firmware build and configuration files. The system accesses the flash disk when starting up, during a firmware upgrade, or when an administrator is using the CLI or GUI to change the FortiOS configuration. Under normal operating conditions this LED flashes occasionally, but is mostly off.	
STA	Green	Normal operation.	
	Red	The FortiGate-5001SX is starting or a fault condition exists.	
IPM	Blue	The FortiGate-5001SX is ready to be hot-swapped (removed from the chassis). If the IPM light is blue and no other LEDs are lit the FortiGate-5001SX board has lost power, possibly because of a loose or incorrectly aligned left extraction lever.	
	Flashing Blue	The FortiGate-5001SX is changing from hot swap to running mode or from running mode to hot swap.	
	Off	Normal operation. The FortiGate-5001SX board is in contact with the chassis backplane.	
1, 2, 3, 4	Green	The correct cable is connected to the gigabit SFP interface.	
	Flashing	Network activity at the gigabit SFP interface.	
5, 6, 7, 8	Link LED	Green	The correct cable is inserted into this interface and the connected equipment has power.
		Flashing	Network activity at this interface.
	Speed LED	Green	The interface is connected at 1000 Mbps.
		Amber	The interface is connected at 100 Mbps.
		Unlit	The interface is connected at 10 Mbps.

Connectors

Table 15 lists and describes the FortiGate-5001SX connectors.

Table 15: FortiGate-5001SX connectors

Connector	Type	Speed	Protocol	Description
1, 2, 3, 4	LC SFP	1000Base-SX	Ethernet	Four gigabit SFP interfaces that can accept fiber or copper gigabit transceivers. These interfaces only operate at 1000Mbps.
5, 6, 7, 8	RJ-45	10/100/1000 Base-T	Ethernet	Copper gigabit connection to 10/100/1000Base-T copper networks.
CONSOLE	DB-9	9600 bps 8/N/1	RS-232 serial	Serial connection to the command line interface.
USB	USB			FortiUSB key firmware updates and configuration backup (FortiOS v3.0).

Base backplane gigabit interfaces

The FortiGate-5001SX port9 and port10 base backplane gigabit interfaces can be used for HA heartbeat communication between FortiGate-5001SX boards installed in the same or in different FortiGate-5000 chassis. You can also configure FortiGate-5001SX boards to use the base backplane interfaces for data communication between FortiGate boards. To support base backplane communications your FortiGate-5140 or 5050 chassis must include one or more FortiSwitch-5003 boards. FortiSwitch-5003 boards are installed in chassis slots 1 and 2. The FortiGate-5020 chassis supports base backplane communication with no additions or changes to the chassis.

For information about base backplane communication in FortiGate-5140 and FortiGate-5050 chassis, see the [FortiGate-5000 Base Backplane Communication Guide](#). For information about the FortiSwitch-5003 board, see the [FortiSwitch-5003 Guide](#).

FortiSwitch-5003A system

The FortiSwitch-5003A board provides 10/1-gigabit fabric backplane channel layer-2 switching and 1-gigabit base backplane channel layer-2 switching in a dual star architecture for the FortiGate-5140 and FortiGate-5050 chassis. The FortiSwitch-5003A board provides a total capacity of 200 Gigabits per second (Gbps) throughput.

The FortiGate-5140 chassis is a 14-slot ATCA chassis and the FortiGate-5050 chassis is a 5-slot ATCA chassis. In both chassis the FortiSwitch-5003A board is installed in the first and second hub/switch fabric slots. For most versions of the FortiGate-5140 and 5050 chassis the hub/switch fabric slots are slots 1 and 2. For more information about these chassis see the [FortiGate-5140 Chassis Guide](#) and the [FortiGate-5140 Chassis Guide](#).

You can use the FortiSwitch-5003A board for fabric and base backplane layer-2 switching for FortiGate-5000 boards installed in slots 3 and up in FortiGate-5140 and FortiGate-5050 chassis. Usually you would use the base channel for management traffic (for example, HA heartbeat traffic) and the fabric channel for data traffic. FortiSwitch-5003A boards can be used for fabric and base backplane layer-2 switching within a single chassis and between multiple chassis.

The FortiSwitch-5003A system also supports 802.3ad static mode layer-2 link aggregation, 802.1q VLANs, and 802.1s Multi-Spanning Tree Protocol (MSTP) for the fabric channels. You can use these features to configure link aggregation and support redundant FortiSwitch-5003A switch configurations to distribute traffic to multiple FortiGate-5000 boards. The FortiGate-5000 boards must operate in Transparent mode, all are managed separately and all must have the same configuration.

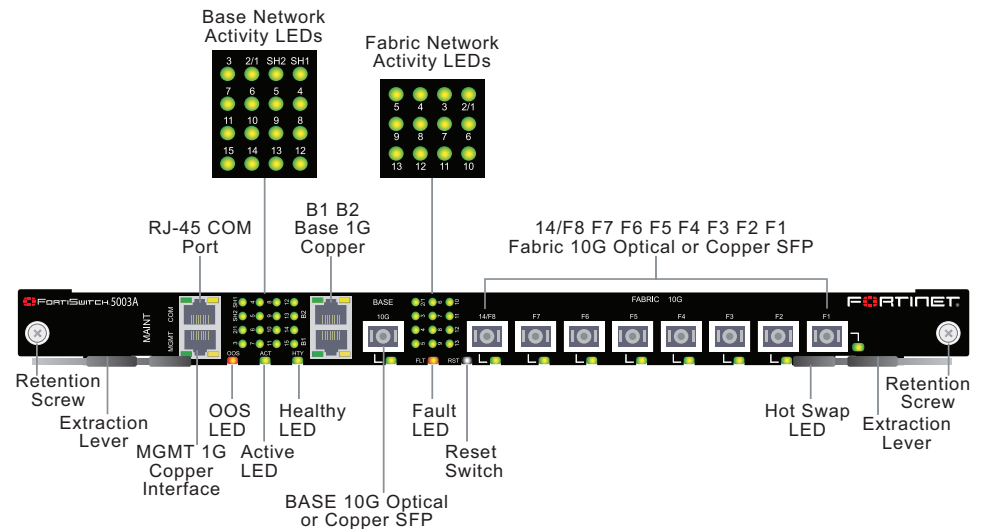
A FortiSwitch-5003A board in hub/switch fabric slot 1 provides communications on fabric channel 1 and base channel 1. A FortiSwitch-5003A board in hub/switch fabric slot 2 provides communications on fabric channel 2 and base channel 2. If your chassis includes one FortiSwitch-5003A board you can install it in hub/switch fabric slot 1 or 2 and configure the FortiGate-5000 boards installed in the chassis to use the correct fabric and base backplane interfaces.

For a complete 10-gigabit fabric backplane solution you must install FortiGate-5000 hardware that supports 10-gigabit connections. For example, a FortiGate-5001A board combined with a FortiGate-RTM-XB2 module provides two 10-gigabit fabric interfaces. You can install the FortiGate-5001A boards in chassis slots 3 and up and FortiGate-RTM-XB2 modules in the corresponding RTM slots on the back of the chassis.

The FortiSwitch-5003A board includes the following features:

- One 1-gigabit base backplane channel for layer-2 base backplane switching between FortiGate-5000 boards installed in the same chassis as the FortiSwitch-5003A
- One 10/1-gigabit fabric backplane channel for layer-2 fabric backplane switching between FortiGate-5000 boards installed in the same chassis as the FortiSwitch-5003A
- Two front panel base backplane one-gigabit copper gigabit interfaces (B1 and B2) that connect to the base backplane channel

Figure 21: FortiSwitch-5003A front panel



- One front panel base backplane 10-gigabit optical or copper SFP+ interface (BASE 10G) that connects to the base backplane channel
- Eight front panel fabric backplane 10-gigabit optical or copper SFP+ interfaces (14/F8, F7, F6, F5, F4, F3, F2, and F1)
- One gigabit out of band management ethernet interface (MGMT)
- One RJ-45, RS-232 serial console connection (COM)
- Mounting hardware
- LED status indicators
- IEEE 802.1q VLANs
- IEEE 802.3ad static mode layer-2 link aggregation
- Link aggregation using a hash algorithm based on source and destination IP addresses
- Multi-Spanning Tree Protocol (MSTP) (IEEE 802.1s) to support redundant FortiSwitch-5003A boards and external MSTP-compatible switches
- Heartbeat between FortiGate-5001A and FortiGate-5005FA2 boards and the FortiSwitch-5003A over the fabric channel to support MSTP (configurable from the FortiGate-5001A and FortiGate-5005FA2 systems)
- Standard FortiOS command line interface (CLI) for configuring fabric switch settings (VLANs, MSTP, trunks, and so on)

Front panel LEDs and connectors

From the FortiSwitch-5003A front panel you can view the status of the board LEDs to verify that the board is functioning normally. The front panel includes a reset switch for restarting the FortiSwitch-5003A board.

The front panel also contains connectors to the fabric and base channels, an out of band management ethernet interface, and an RJ-45 RS-232 console port for connecting to the FortiSwitch-5003A CLI.

LEDs

Table 16 lists and describes the FortiSwitch-5003A front panel LEDs.

Table 16: FortiSwitch-5003A front panel LEDs and switches

LED	State	Description	
OOS (Out of Service)	Off	Normal operation.	
	Red	Out of service. The LED turns on if the FortiSwitch-5003A board fails. The LED may also flash briefly when the board is powering on.	
ACT (Active)	Green	The FortiSwitch-5003A board is powered on and operating normally.	
	Yellow	Caution status. Caution status is indicated by the fault condition of the HTY and FLT LEDs.	
	Off	The board is not connected to power.	
HTY (Healthy)	Green	The FortiSwitch-5003A board is powered on and operating normally.	
	Off	The board health system has detected a fault.	
FLT (Fault)	Off	Normal operation.	
	Yellow	Cannot establish a link to a configured interface or another connection problem external to the FortiSwitch-5003A board. This LED may indicate issues that do not affect normal operation.	
RST (Reset switch)		Press and hold Reset for three seconds to restart the FortiSwitch-5003A board.	
Base Network Activity LEDs	Solid Green	Indicates this interface is connected to the 1-gigabit base channel interface of a FortiGate-5000 board. Table 17 on page 56 lists the base network activity LEDs and the interface that each represents.	
	Blinking Green	Indicates 1-gigabit network traffic on this interface.	
	Off	No link.	
Fabric Network Activity LEDs	Solid Green	Indicates this interface is connected to the 10/1-gigabit fabric channel interface of a FortiGate-5000 board. Table 19 on page 58 lists the fabric network activity LEDs and the interface that each represents.	
	Blinking Green	Indicates 10/1-gigabit network traffic on this interface. Table 19 on page 58 lists the fabric network activity LEDs and the interface that each represents.	
	Off	No link.	
MGMT, B1, B2 (Management and base 1-gigabit LEDs)	Link/Act (Left LED)	Solid Green	Indicates this interface is connected with the correct cable and the attached network device has power.
		Blinking Green	Indicates network traffic on this interface.
		Off	No Link
	Speed (Right LED)	Green	Connection at 1 Gbps.
		Amber	Connection at 100 Mbps.
		Off	Connection at 10 Mbps.

Table 16: FortiSwitch-5003A front panel LEDs and switches (Continued)

LED	State	Description
BASE 10G, 14/F8, F7, F6, F5, F4, F3, F2, F1 (Base and Fabric 10 gigabit LEDs)	Solid Green	Indicates this interface is connected to a 10-gigabit network device with the correct cable and the attached network device has power.
	Blinking Green	Indicates 10-gigabit network traffic on this interface.
	Off	No link.
HS (Hot Swap)	Blue	The FortiSwitch-5003A is ready to be hot-swapped (removed from the chassis). If the HS light is blue and no other LEDs are lit the FortiSwitch-5003A board has lost power
	Flashing Blue	The FortiSwitch-5003A is changing from hot swap to running mode or from running mode to hot swap. This happens when the FortiSwitch-5003A board is starting up or shutting down.
	Off	Normal operation. The FortiSwitch-5003A board is in contact with the chassis backplane.

Base channel interfaces

Table 17 lists and describes the FortiSwitch-5003A base backplane channel interfaces. The base backplane interfaces are not configurable or visible from the FortiSwitch-5003A CLI.

Figure 22: FortiSwitch-5003A base network activity LEDs

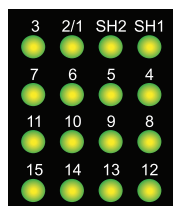


Table 17: Base channel interfaces and network activity LEDs

Interface Name	Description
SH1	If the FortiSwitch-5003A board is in the first hub/switch fabric slot, this LED indicates a backplane connection to shelf manager 1. If the FortiSwitch-5003A board is in second hub/switch fabric slot this LED indicates a backplane connection to shelf manager 2. This LED may not be lit even if a shelf manager is present if the shelf manager is configured to use its front panel interface.
15 and SH2	Not used.
2/1	Base channel connection between base channels 1 and 2. The 2/1 LED is lit if there is any board capable of connecting to the base channel in the other slot. For example, if the FortiSwitch-5003A board is installed in the first hub/switch fabric slot, this LED will be lit if any board is installed in the second hub/switch fabric slot, including a FortiSwitch-5003A board or any FortiGate-5000 board.
3 to 14	Base channel connection to FortiGate-5000 boards in chassis slots 3 to 14.

Table 17: Base channel interfaces and network activity LEDs

Interface Name	Description
B1 and B2	Front panel gigabit base channel interfaces B1 and B2. Use these interfaces to connect your network to the base channel, to connect base channel 1 to base channel 2, or to connect a base channel on one chassis to a base channel on another chassis.
BASE 10G	Front panel 10-gigabit base channel interface. Use this interface to connect a 10-gigabit network to the base channel. 10-gigabit communication is not supported across the base channels but this interface is still available if you need to connect the base channel to a 10-gigabit network.

Fabric channel interfaces

[Table 18](#) lists and describes the FortiSwitch-5003A fabric channel interfaces. You can configure fabric interface settings, group fabric interfaces into trunks, and configure MSTP spanning tree settings for fabric interfaces from the FortiSwitch-5003A CLI.

Table 18: Fabric channel interfaces

Interface Name		Description
Front Panel	CLI*	
2/1	slot-2/1	Interface between fabric channel 1 and fabric channel 2. If there are two FortiSwitch-5003A boards installed in a chassis this interface can be used to communicate between them. In some configurations you may have to disable this communication.
3 to 13	slot-3 to slot-13	Fabric backplane slots 3 to 13. The 3 to 13 fabric network activity LEDs are lit if there are FortiGate boards in chassis slots 3 to 13.
14/F8	slot-14/f8	Front panel interface 14/F8. Fabric backplane slot 14 and front panel interface 14/F8 share the same FortiSwitch-5003A switch port. By default the the front panel interface 14/F8 is enabled and fabric backplane slot 14 is disabled. You can change this setting using a switch on the FortiSwitch-5003A board.
F1 to F7	f1 to f7	Front panel 10-gigabit fabric interfaces F1 to F7. Use these interfaces to connect your network to the fabric channel, to connect fabric channel 1 to fabric channel 2, or to connect a fabric channel on one chassis to a fabric channel on another chassis.

* You can configure settings for FortiSwitch-5003A fabric interfaces from the FortiSwitch-5003A CLI. The CLI columns show the names of the interfaces as they appear on the FortiSwitch-5003A CLI.

The fabric network activity LEDs show links and network activity for the interfaces and connections listed in [Table 19](#).

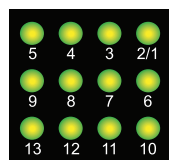
Figure 23: FortiSwitch-5003A fabric network activity LEDs

Table 19: Fabric network activity LEDs

Fabric network activity LED	Interface or connection
2/1	Fabric channel connection between fabric channel 1 and fabric channel 2. This LED is lit if there are two FortiSwitch-5003A boards installed in the chassis to indicate fabric backplane communication between them.
3 to 13	Fabric backplane connection to FortiGate-5000 boards in chassis slots 3 to 13.

Front panel connectors

Table 20 lists and describes the FortiSwitch-5003A front panel connectors.

Table 20: FortiSwitch-5003A connectors

Connector	Type	Speed	Protocol	Description
MGMT	RJ-45	10/100/1000 Base-T	Ethernet	Copper gigabit connection to out of band management interface.
COM	RJ-45	9600 bps 8/N/1	RS-232 serial	Serial connection to the command line interface.
B1, B2	RJ-45	10/100/1000 Base-T	Ethernet	Copper gigabit connection to the base backplane channel.
BASE 10G	SFP+	10 Gbps	Ethernet	SFP+ 10 gigabit connection to the base backplane channel.
FABRIC 10G, 14/F8, F7, F6, F5, F4, F3, F2, F1	SFP+	10 Gbps	Ethernet	SFP+ 10 gigabit connection to the fabric backplane channel.

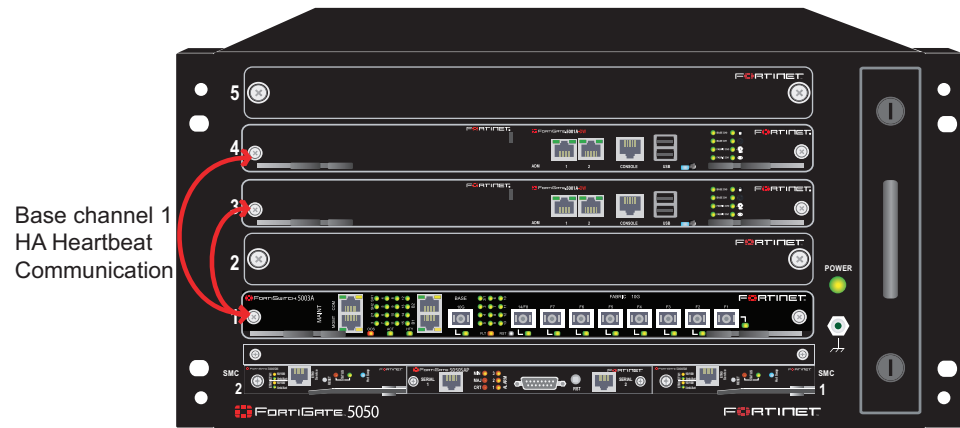
FortiSwitch-5003A configurations

You can operate the FortiSwitch-5003A board as a fabric and base channel layer-2 switch for any FortiGate-5000 board. The FortiSwitch-5003A board is compatible with all FortiGate-5000 boards.

Base and fabric gigabit switching within a chassis

Figure 24 shows a FortiGate-5050 chassis with a FortiSwitch-5003A board in slot 1 and two FortiGate-5001A boards in slots 3 and 4. In this configuration the FortiGate-5001A boards are using base channel 1 for HA heartbeat communication. The FortiGate-5001A boards use base1 as the HA heartbeat interface.

Figure 24: FortiSwitch-5003A base channel 1 HA heartbeat communication

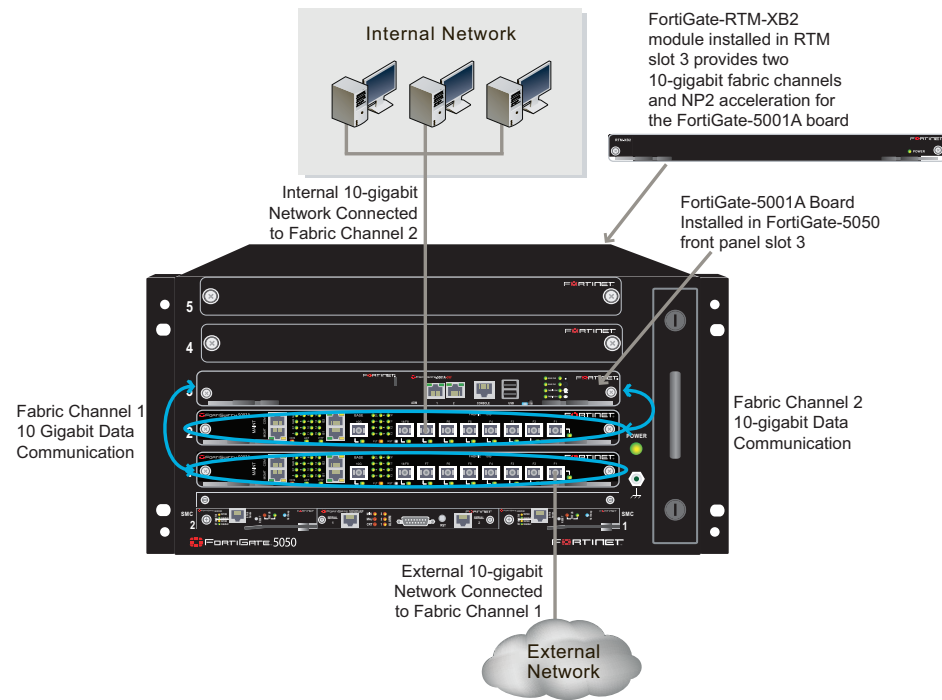


Fabric 10-gigabit switching within a chassis

One FortiGate-RTM-XB2 provides 10-gigabit connections to both FortiGate-5001A fabric channels. The FortiGate-RTM-XB2 also provides NP2 packet acceleration for each fabric channel. To effectively use NP2 acceleration, packets must be received by the FortiGate-5001A board on one fabric channel and exit from the FortiGate-5001A board on the same fabric channel or on the other fabric channel. See the [FortiGate-RTM-XB2 System Guide](#) for more information.

Figure 25 shows a FortiGate-5050 chassis containing two FortiSwitch-5003A boards and one FortiGate-5001A board. Using these components this chassis supplies 10-gigabit connectivity between the external and internal network.

Figure 25: Example 10-gigabit connection between internal and external networks

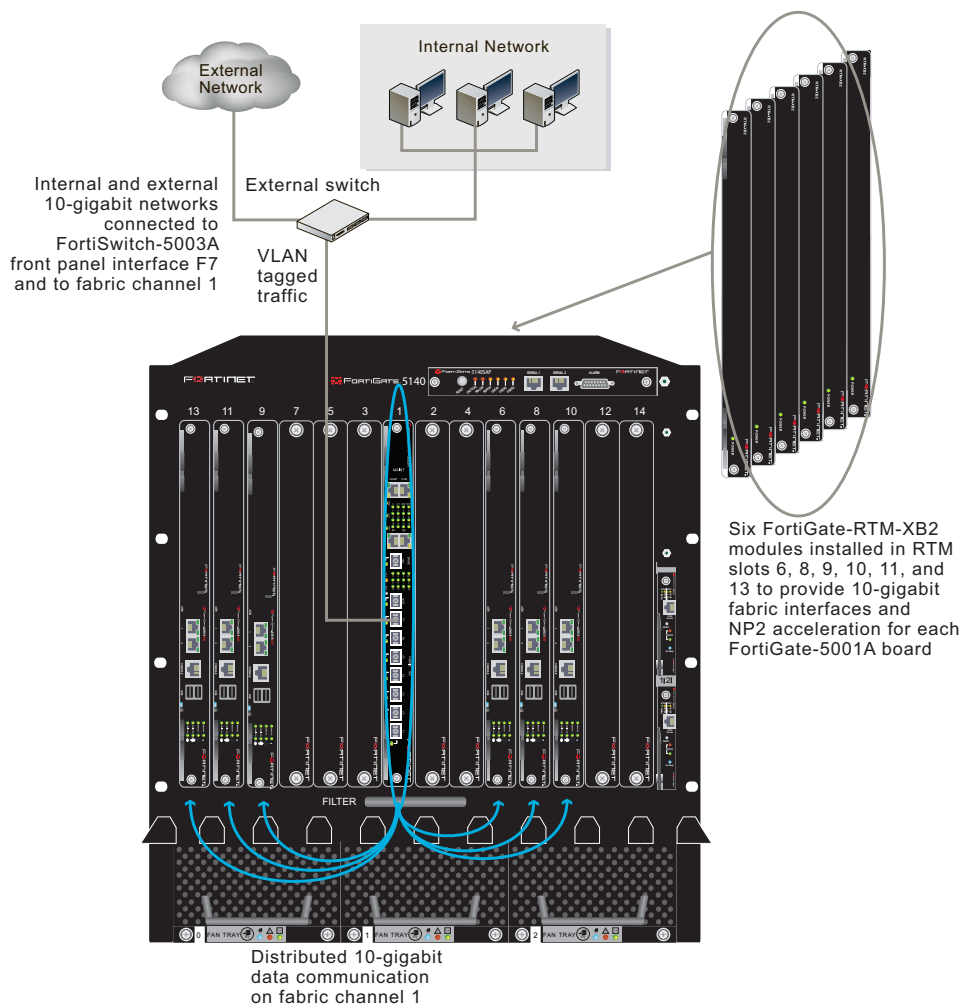


Layer-2 link aggregation and redundancy configurations

The FortiSwitch-5003A board supports 802.3ad static mode layer-2 link aggregation, 802.1q VLANs, and 802.1s Multi-Spanning Tree Protocol (MSTP) for the fabric channels. You can use these features to configure link aggregation and support redundant FortiSwitch-5003A configurations to distribute traffic to multiple FortiGate-5001A or 5005FA2 boards.

Figure 26 shows a basic link aggregation configuration using a single FortiSwitch-5003A board. In this configuration the external switch is connected to FortiSwitch-5003A front panel f5 interface. The switch adds VLAN tags to traffic from the internal and external networks.

Figure 26: Basic link aggregation configuration



FortiSwitch-5003 system

The FortiSwitch-5003 board provides base backplane interface switching for the FortiGate-5140 chassis and the FortiGate-5050 chassis. You can use this switching for data communication or HA heartbeat communication between the base backplane interfaces of FortiGate-5000 series boards installed in slots 3 and up in these chassis. FortiSwitch-5003 boards can be used for base backplane communication in a single chassis or between multiple chassis.

Install FortiSwitch-5003 boards in chassis slots 1 and 2. A FortiSwitch-5003 board in slot 1 provides communications on base backplane interface 1. A FortiSwitch-5003 board in slot 2 provides communications on base backplane interface 2.

If your configuration includes only one FortiSwitch-5003 board you can install it in slot 1 or slot 2 and configure the FortiGate-5000 boards installed in the chassis to use the correct base backplane interface.

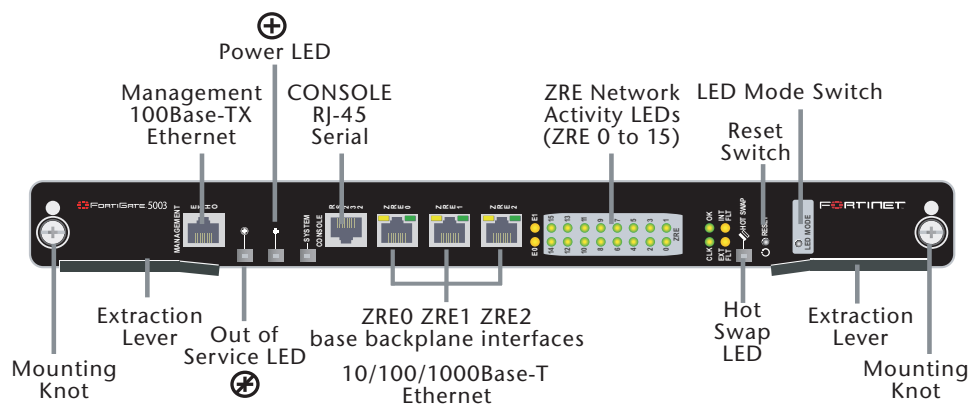
The FortiSwitch-5003 board includes the following features:

- A total of 16 10/100/1000Base-T gigabit ethernet interfaces:
 - 13 backplane 10/100/1000Base-T gigabit interfaces for base backplane switching between FortiGate-5000 series boards installed in the same chassis as the FortiSwitch-5003
 - Three front panel 10/100/1000Base-T gigabit interfaces (ZRE0, ZRE1, ZRE2) for base backplane switching between two or more FortiGate-5000 series chassis
- One 100Base-TX out of band management ethernet interface (ETH0)
- RJ-45 RS-232 serial console connection (CONSOLE)
- Mounting hardware
- LED status indicators

Front panel LEDs and connectors

From the FortiSwitch-5003 front panel you can view the status of the board LEDs to verify that the board is functioning normally. You can also connect the FortiSwitch-5003 board in one chassis to a FortiSwitch-5003 board in another chassis through the front panel ethernet connections. The front panel also includes and out of band management ethernet interface and the RJ-45 console port for connecting to the FortiSwitch-5003 CLI.

Figure 27: FortiSwitch-5003 front panel



LEDs

Table 21 lists and describes the FortiSwitch-5003 board front panel LEDs.

Table 21: FortiSwitch-5003 board front panel LEDs and switches

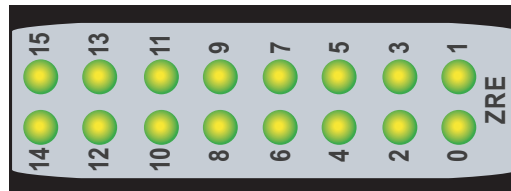
LED	State	Description
✖	Off	Normal operation.
	Red	Out of service. The LED turns on if the FortiSwitch-5003 board fails. The LED may also flash briefly when the board is powering on.
+	Green	The FortiSwitch-5003 board is powered on and operating normally.
	Yellow	Caution status. Caution status is indicated by the fault condition of the CLOCK, OK or INT FLT LEDs.
	Off	The board is not connected to power.
System	Off	Normal operation.
E0, E1	Yellow or Green	Link status of out of band management interfaces (not used).
ZRE 0-15 (ZRE network activity LEDs, LED Mode switch changes mode)	Green	Link/Activity mode: Blinking to indicate network traffic on this interface. Table 22 on page 63 lists the ZRE LEDs and the interface that each represents. Link/Speed mode: 100 Mbps connection.
	Yellow	Link/Activity mode: The interface is disabled and cannot forward packets. (not used) Link/Speed mode: 1000 Mbps connection.
	Off	Link/Activity mode: No link. Link/Speed mode: 10 Mbps connection.
LED Mode switch		Change the ZRE network activity LED display mode. Normally the ZRE network activity LEDs operate in Link/Activity mode. In this mode the LEDs flash green to indicate a link and to indicate network traffic. Press this button to switch the ZRE LEDs to Link/Speed mode. In Link/Speed mode the ZRE LEDs use a solid color to indicate a link. The color of the LED indicates the speed of the link.
CLK	Flashing Green	Initialization completed successfully.
OK	Green	Initialization completed successfully.

Table 21: FortiSwitch-5003 board front panel LEDs and switches (Continued)

LED	State	Description
EXT FLT	Off	Normal operation.
	Yellow	Cannot establish a link to a configured interface or another connection problem external to the FortiSwitch-5003 board. This LED may indicate issues that do not affect normal operation.
INT FLT	Off	Normal operation.
	Yellow	Failure of internal tests. Indicates a hardware or software problem with the FortiSwitch-5003 board.
Hot Swap	Blue	Indicates the FortiSwitch-5003 board is ready to be hot swapped. During a hot swap, the LED is on. The LED turns off when the FortiSwitch-5003 board is correctly installed.
Reset switch		Press and hold Reset for three seconds to restart the FortiSwitch-5003 board.

About the ZRE network activity LEDs

The ZRE network activity LEDs show links and network activity for the interfaces and connections listed in [Table 22](#).

Figure 28: FortiSwitch-5003 ZRE network activity LEDs**Table 22: ZRE network activity LEDs FortiSwitch-5003 interfaces and connections**

ZRE network activity LED	Interface or connection
0	ZRE0 front panel interface.
1	ZRE1 front panel interface.
2	ZRE2 front panel interface.
3 to 14	Base backplane connection to FortiGate-5000 series boards in chassis slots 3 to 14.
15	Base backplane link. Indicates that the FortiSwitch-5003 board can connect to the base backplane interface.

Connectors

Table 23 lists and describes the FortiSwitch-5003 front panel connectors.

Table 23: FortiSwitch-5003 connectors

Connector	Type	Speed	Protocol	Description
ETH0	RJ-45	100Base-T	Ethernet	Front panel out of band management interface. A second out of band management interface, ETH1, connects to the shelf managers. Neither of the out of band management interfaces are used.
CONSOLE	RJ-45	9600 bps	RS-232 serial	Serial connection to the command line interface.
ZRE0, ZRE1, ZRE2	RJ-45	10/100/1000 Base-T	Ethernet	Redundant connections to another FortiSwitch-5003 board in an different FortiGate-5140 or FortiGate-5050 chassis. Use these interfaces for base backplane interface connections between FortiGate-5000 series chassis.

Base backplane communications

This section provides a brief introduction to using FortiSwitch-5003 boards for base backplane communication.

FortiSwitch-5003 boards installed in a FortiGate-5140 or FortiGate-5050 chassis in slot 1 or slot 2 provide base backplane switching for all of the FortiGate-5000 series boards installed in chassis slots 3 and above. Base backplane switching can be used for HA heartbeat communication and for data communication between FortiGate-5000 series boards.

The FortiGate-5000 series boards can all be installed in the same chassis, or you can use the FortiSwitch-5003 front panel ZRE interfaces for base backplane communication among multiple FortiGate-5140 and FortiGate-5050 chassis. The communication can be among a collection of the same chassis (for example, multiple FortiGate-5050 chassis) or among a mixture of FortiGate-5140 and FortiGate-5050 chassis. In most cases you would connect the same base backplane interfaces together, but you can also use the FortiSwitch-5003 front panel ZRE interfaces for connections between base backplane interface 1 and base backplane interface 2. Again these connections can be within the same chassis or among multiple chassis.

A FortiSwitch-5003 board in slot 1 provides communications on base backplane interface 1. The FortiGate-5001SX and the FortiGate-5001FA2 boards communicate with base backplane interface 1 using the interface named port9. The FortiGate-5005FA2 board communicates with base backplane interface 1 using the interface named base1.

A FortiSwitch-5003 board in slot 2 provides communications on base backplane interface 2. The FortiGate-5001SX and the FortiGate-5001FA2 boards communicate with base backplane interface 2 using the interface named port10. The FortiGate-5005FA2 board communicates with base backplane interface 2 using the interface named base2.

In a single chassis, more than one cluster can use the same base backplane interface for HA heartbeat communication. To separate heartbeat communication for multiple clusters on the same base backplane interface, configure a different HA group name and password for each cluster.

In a single chassis, you can also use the same base backplane interface for data and HA heartbeat communication. If you are operating multiple clusters and multiple data paths on the same base backplane interface you may experience some bandwidth limitations. To increase the amount of bandwidth available you can add a second FortiSwitch-5003 board and use both backplane interfaces for HA heartbeat and data communication.

If you have two FortiSwitch-5003 boards and two backplane interfaces available you can balance the traffic between the base backplane interfaces by how you configure your FortiGate-5000 board data interfaces and HA heartbeat interfaces. For example, if you have two busy FortiGate-5001SX clusters you might configure one cluster to use port9 for HA heartbeat traffic and the other to use port10. If you have a number of data paths that use the same base backplane interfaces you can change the configuration to distribute traffic between both base backplane interfaces.

The FortiGate-5005-DIST security system

The FortiGate-5005-DIST security system is very similar to a single FortiGate unit, but with much higher capacity and with support for failover protection and scalability. The FortiGate-5005-DIST security system consists of a FortiGate-5050 or FortiGate-5140 chassis with one or two Input/Output or I/O boards (FortiController-5208 boards) and one or more worker boards (FortiGate-5005FA2 boards running in DIST mode). The I/O boards provide 10-gigabit and 1-gigabit network connections and distribute traffic to the worker boards. The worker boards provide FortiGate security system functions including firewall, VPN, IPS, antivirus, antispam, and so on.

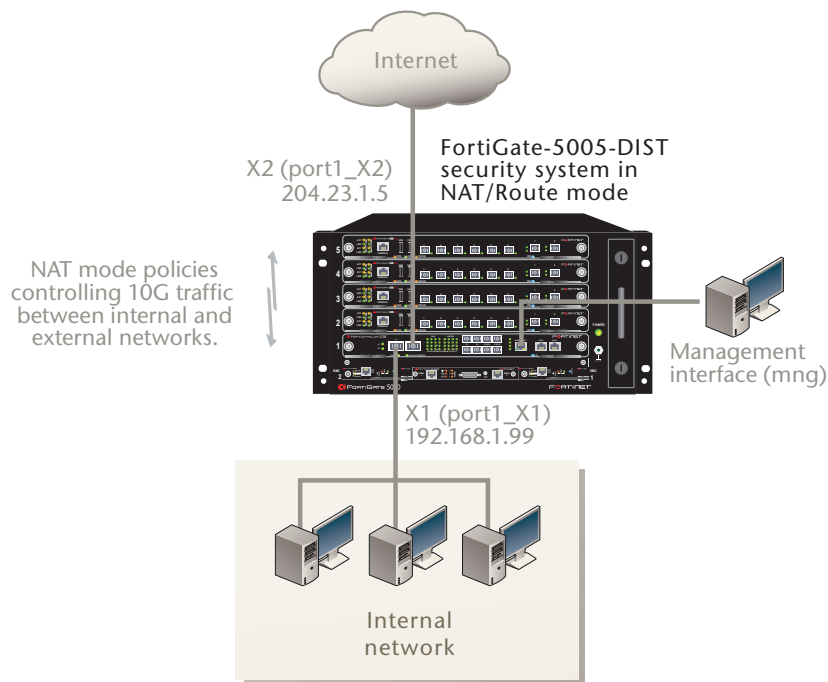
The following topics are included in this section:

- [Basic FortiGate security system configuration](#)
- [FortiController-5208 I/O boards](#)
- [FortiGate-5005FA2 worker boards](#)
- [FortiGate-5005-DIST security system chassis](#)
- [FortiGate-5005-DIST interface names](#)

Basic FortiGate security system configuration

A basic FortiGate security system consists of a single FortiController-5208 board and four FortiGate-5005 boards installed in a FortiGate-5050 or FortiGate-5140 chassis (see [Figure 29 on page 68](#)). This system can be installed in NAT/Route mode between the Internet and a private network. In this configuration, the FortiGate-5005-DIST security system can provide FortiGate services to 10 gigabit traffic passing between the private network and the Internet.

Figure 29: Example basic FortiGate-5005-DIST security system

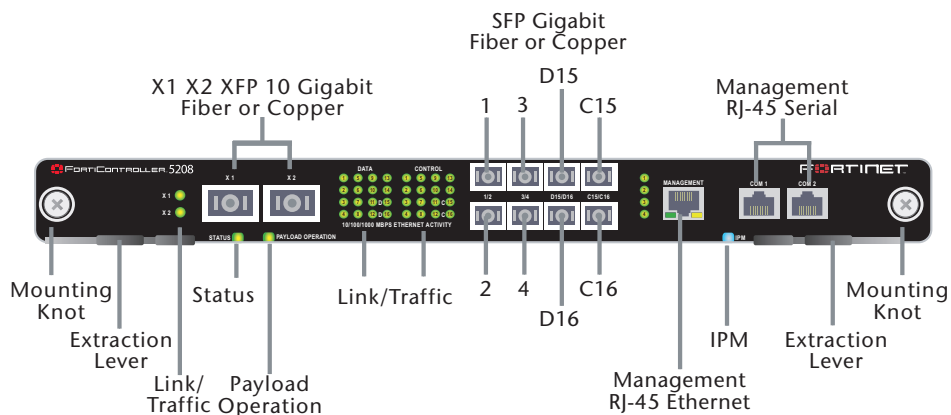


FortiController-5208 I/O boards

Data flows into and out of the FortiGate-5005-DIST system through the I/O boards. The I/O boards are FortiController-5208 boards installed in chassis slots 1 and 2 in a FortiGate-5050 or FortiGate-5140 chassis. The I/O board installed in slot 1 is configured as the primary I/O board. The optional I/O board installed in slot 2 becomes the secondary I/O board. A FortiGate-5005-DIST system can include one or two I/O boards.

As the I/O board, the FortiController-5208 provides all FortiGate-5005-DIST network connections. The FortiController-5208 board provides two 10 gigabit interfaces and four 1 gigabit interfaces for network traffic. The FortiController-5208 front panel also contains four 1 gigabit interfaces. Two of these interfaces support inter-chassis HA and two are for future use. Adding a second FortiController-5208 board doubles the number of FortiGate-5005-DIST network interfaces.

Figure 30: FortiController-5208 front panel

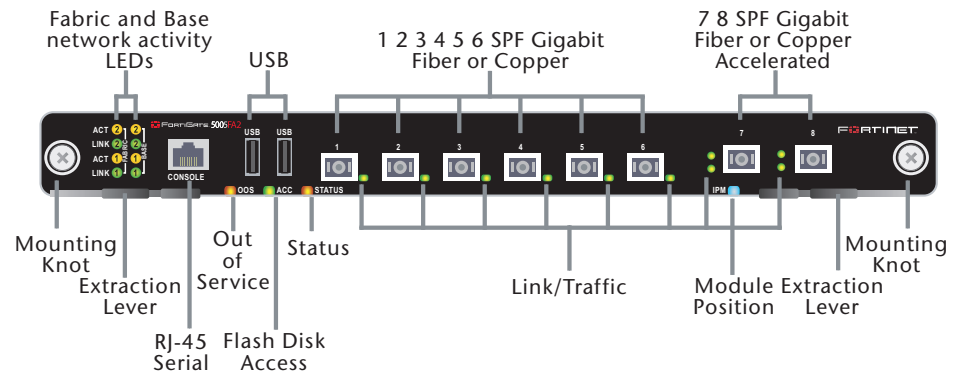


FortiGate-5005FA2 worker boards

The FortiGate-5005FA2 security system serves as the worker board for the FortiGate-5005-DIST security system. Worker boards are identically configured and administered as a single unit from the primary I/O board. Workers are typically installed in slots 3 and above, though FortiGate-5005FA2 security systems with only one I/O board can also have a worker installed in slot 2.

The worker boards apply all of the FortiGate security system functionality to traffic passing through the FortiGate-5005-DIST security system. Traffic is distributed to the worker boards by the I/O boards. The worker boards perform FortiGate functions such as applying firewall policies, virus scanning, IPS and routing to distributed traffic.

Figure 31: FortiGate-5005FA2 front panel



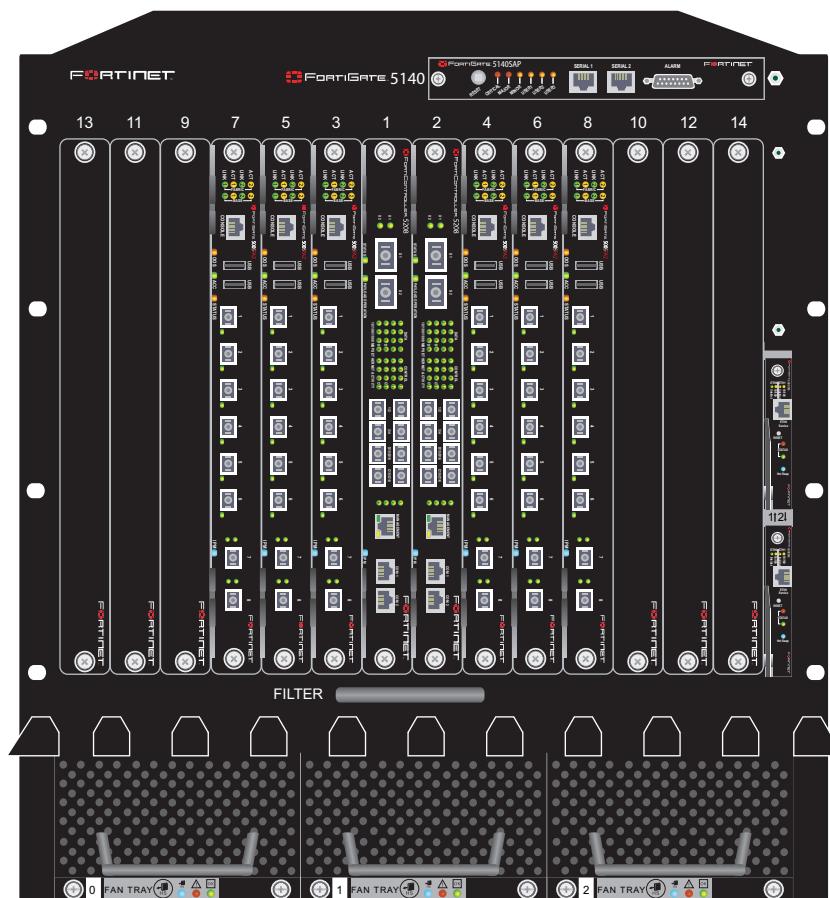
FortiGate-5005-DIST security system chassis

FortiGate-5005-DIST security systems can be installed in FortiGate-5050 or FortiGate-5140 chassis.

FortiGate-5140 chassis

You can install one or two I/O boards in slot 1 and 2 of the FortiGate-5140 ATCA chassis. You can also install up to 12 worker boards in slots 3 to 14 if two I/O boards are used, or up to 13 worker boards in slots 2 to 14 if one I/O board is used. The FortiGate-5140 is a 12U chassis that contains two redundant hot swappable DC power entry boards that connect to -48 VDC Data Center DC power. The FortiGate-5140 chassis also includes three hot swappable cooling fan trays. For details about the FortiGate-5140 chassis see to the [FortiGate-5140 Chassis Guide](#).

Figure 32: FortiGate-5005-DIST components installed in a FortiGate-5140 chassis



FortiGate-5050 chassis

You can install one or two I/O boards in slot 1 and 2 of the FortiGate-5050 ATCA chassis. You can also install up to three worker boards in slots 3 to 5 if two I/O boards are being used, or four worker boards in slots 2 to 5 if one I/O board is used. The FortiGate-5050 is a 5U chassis that contains two redundant DC power connections that connect to -48 VDC Data Center DC power. The FortiGate-5050 chassis also includes a hot swappable cooling fan tray. For details about the FortiGate-5050 chassis, see the [FortiGate-5050 Chassis Guide](#).

Figure 33: FortiGate-5005-DIST components installed in a FortiGate-5050 chassis



FortiGate-5005-DIST interface names

The FortiGate-5005-DIST worker web-based manager and CLI use an internal naming convention to name FortiGate-5005-DIST interfaces. The interface names indicate the I/O board containing the interface and also include the I/O board front panel interface name. The naming convention is:

```
port<I/O_board_number>_<I/O_board_interface_name>
```

where:

<I/O_board_number> is 1 for the interfaces of the primary I/O board installed in chassis slot 1 and 2 for the interfaces of the secondary I/O board installed in chassis slot 2. The interfaces for the secondary I/O board only appear in the web-based manager and CLI when a secondary I/O board is installed.

<I/O_board_interface_name> is the name of the interface as shown on the FortiController-5208 front panel.

[Table 24 on page 72](#) shows the relationship between the names of the primary and secondary board front panel interfaces and the interface names that appear on the FortiGate-5005-DIST worker web-based manager and CLI.

Table 24: FortiGate-5005-DIST interface naming

FortiController-5208 location	FortiController-5208 front panel interface names	Web-based manager and CLI interface names
Primary FortiController-5208 board installed in chassis slot 1	X1	port1_X1
	X2	port1_X2
	1	port1_1
	2	port1_2
	3	port1_3
	4	port1_4
	Management	mng
Secondary FortiController-5208 board installed in chassis slot 2	X1	port2_X1
	X2	port2_X2
	1	port2_1
	2	port2_2
	3	port2_3
	4	port2_4
	Management	Not used.

FortiController-5208 system

You can create a FortiGate-5005-DIST high-throughput multi-threat network security system using one or two FortiController-5208 boards and multiple FortiGate-5005 boards in a FortiGate-5050 or FortiGate-5140 chassis. A FortiGate-5020 chassis cannot be used to create a FortiGate-5005-DIST system. Functionally, one or two FortiController-5208 boards using the processing power of multiple FortiGate-5005 boards function much like a single FortiGate unit, but with far greater capacity.

In a FortiGate-5005-DIST configuration, the FortiGate-5005FA2 boards are used only for their processing power. The FortiController-5208 assigns tasks to each FortiGate-5005FA2 board and provides all external connections to the network. Given this division of labor, the FortiController-5208 board is also called the I/O board and the FortiGate-5005FA2 boards are also called the worker boards.

The FortiController-5208 board provides two 10 gigabit interfaces and four 1 gigabit interfaces for network traffic. The FortiController-5208 front panel also contains an additional four 1-gigabit interfaces for inter-chassis HA and future use. Optionally, you can double the number of available of network interfaces by adding a second FortiController-5208.

Once initial set-up is complete, all subsequent administration and configuration of the FortiController-5208 boards and FortiGate-5005 boards is done through the primary FortiController-5208 board.

The FortiGate-5005 boards are administered as a single unit, and therefore configured identically. All traffic is distributed to the FortiGate boards using the backplane interfaces so no front panel connections are required for the FortiGate boards.

The FortiController-5208 board includes the following features:

- Two 10 gigabit interfaces that can accept fiber or copper 10 gigabit Small Form factor Pluggable (XFP) fiber or copper transceivers.
- Eight 1 gigabit front panel network interfaces that can accept Small Form factor Pluggable (SFP) fiber or copper transceivers. Four of these interfaces are for data, two for inter-chassis high-availability (HA) connections, and two for future use.
- One fabric and two base backplane gigabit interfaces.
- Two RJ-45 RS-232 serial console management connections.
- An RJ-45 Ethernet management connection.
- Mounting hardware
- LED status indicators

Before you can connect any FortiController-5208 front panel interfaces, you must insert the XFP or SFP transceivers into the FortiController-5208 front panel cage slots.

This chapter includes the following information about the FortiController-5208 board:

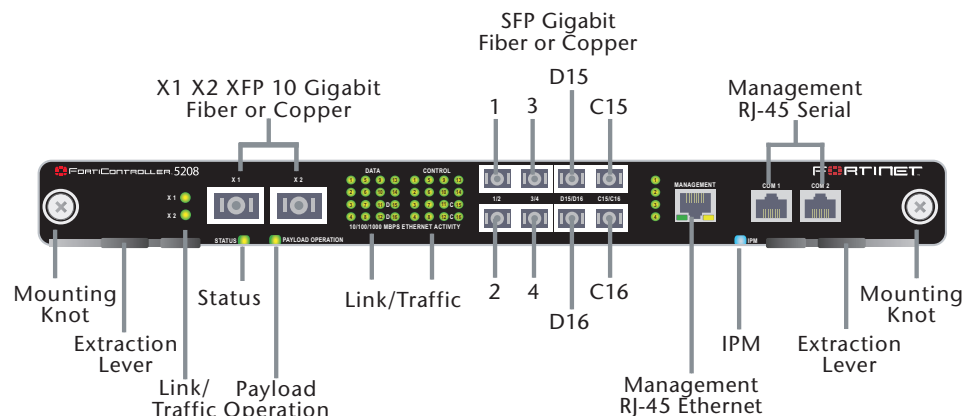
- [Front panel LEDs and connectors](#)
- [Backplane gigabit interfaces](#)
- [Installing XFP and SFP transceivers](#)

- [Inserting a FortiController-5208 module into a chassis](#)
- [Removing a FortiController-5208 module from a chassis](#)
- [Troubleshooting](#)

Front panel LEDs and connectors

From the FortiController-5208 front panel you can view the status of the board LEDs to verify that the board is functioning normally. LEDs also indicate connections and traffic for the front panel and backplane interfaces. You also connect the FortiController-5208 board to your network through the front panel XFP and SFP connections. The front panel also includes two RJ-45 serial console ports for connecting to the FortiController-5208 CLI and an Ethernet RJ-45 port for connecting to the CLI and GUI management interfaces over a network.

Figure 34: FortiController-5208 front panel



LEDs

Table 25 lists and describes the FortiController-5208 board LEDs.

Table 25: FortiController-5208 board LEDs

LED	State	Description
X1, X2	Green	The correct cable is connected to the 10 gigabit XFP interface.
STATUS	Off	The STATUS LED is always off, even when the FortiController-5208 board is starting or operating normally.
PAYLOAD OPERATION	Green	
DATA	1-16	Green The data LEDs display base backplane connections of the FortiController-5208 board and the 5005 boards, over which the load-balanced traffic is sent. LED 1 corresponds to the FortiController-5208 board's connection, LEDs 3 through 14 are for connections to the corresponding slots in a 5050 or 5140 chassis. LEDs 15 and 16 are for the HA ports D15/D16 on the front panel. Due to the organization of the backplane, LED 2 will always be off, even if an operating FortiController-5208 is in slot 2.

Table 25: FortiController-5208 board LEDs (Continued)

LED		State	Description
CONTROL	1-16	Green	The control LEDs display the fabric backplane connections of the FortiController-5208 board, an optional secondary FortiController-5208 board, and all the 5005 boards, over which management communication is sent. LED 1 is for the FortiController-5208 board's connection. LEDs 2 through 14 are for connections to the corresponding slots in a 5050 or 5140. LEDs 15 and 16 are for future use.
		Flashing	Management communication activity on the fabric backplane connection.
1, 2, 3, 4		Green	The correct cable is connected to the gigabit SFP interface.
		Flashing	Network activity at the gigabit SFP interface.
IPM		Blue	The FortiController-5208 is ready to be hot-swapped (removed from the chassis). If the IPM light is blue and no other LEDs are lit the FortiController-5208 board has lost power. See "Inserting a FortiController-5208 module into a chassis" on page 10 for more information.
		Flashing Blue	The FortiController-5208 is changing from hot swap to running mode or from running mode to hot swap.
		Off	Normal operation. The FortiController-5208 board is in contact with the chassis backplane.
MANAGEMENT	Link LED	Amber	The correct cable is inserted into this interface and the connected equipment has power.
		Flashing	Network activity at this interface.
	Speed LED	Green	The interface is connected at 1000 Mbps.
		Amber	The interface is connected at 100 Mbps.
		Unlit	The interface is connected at 10 Mbps.

The control LEDs of a secondary FortiController-5208 board will be synchronized to the control LEDs of the primary because all the installed boards use the same fabric backplane network to communicate. Each FortiController-5208 board has its own base backplane network with which to exchange data traffic with the worker boards so the data LEDs of each FortiController-5208 board will indicate only its own communication.

Connectors

[Table 26](#) lists and describes the FortiController-5208 board connectors.

Table 26: FortiController-5208 connectors

Connector	Type	Speed	Protocol	Description
X1, X2	XFP	10 Gbps	Ethernet	Two 10 gigabit XFP interfaces that can accept fiber or copper transceivers. These interfaces operate only at 10 Gbps. See "Installing XFP and SFP transceivers" on page 9 for more information.

Table 26: FortiController-5208 connectors (Continued)

Connector	Type	Speed	Protocol	Description
1, 2, 3, 4	LC SFP	1000 Mbps	Ethernet	Four 1 gigabit SFP interfaces that can accept fiber or copper transceivers. These interfaces operate only at 1000Mbps. See "Installing XFP and SFP transceivers" on page 9 for more information.
D15, D16	LC SFP	1000 Mbps	Ethernet	Two 1 gigabit SFP interfaces used for inter-chassis high-availability (HA) connections.
C15, C16	LC SFP			For future use.
COM1, COM2	RJ-45	9600 bps	RS-232 serial	Serial connection to the command line interface.
MANAGEMENT	RJ-45	1000 Mbps	Ethernet	Ethernet management connection to the FortiController-5208 web-based manager and command line interface.

Backplane gigabit interfaces

The FortiController-5208 board uses the chassis backplane gigabit interfaces for all communication with boards installed in the chassis. This communication includes:

- Management communication between the primary FortiController-5208, the optional secondary FortiController-5208, and the FortiGate-5005FA2 boards.
- Delivery of traffic data to the FortiGate-5005FA2 boards for processing.
- Receiving processed traffic from the FortiGate-5005FA2 boards.
- If installed, the secondary FortiController-5208 board also delivers data traffic to the FortiGate-5005FA2 boards and receives the processed traffic from them.

No front panel cables are required for connections between the installed boards. Once the FortiController-5208 board is configured as the primary, and the FortiGate-5005FA2 boards are configured to use the LDB firmware, all communication between the installed boards is automatic and requires no configuration.

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